EXHIBIT LIST

HS2

LANDSCAPE DESIGN APPROACH

July 2015

hs2 engine for growth

DRAFT

P7564 (1)

HOC/10518/0002

hs2 engine for growth

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

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Document Produced by:
Arup

Document Version:
D1

Spring bluebells, an example of how seasonal change can add beauty and enrich the landscape for the visitor © Matt Gibson

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HOC/10518/0003

Context

An extract of the Draft HS2 Landscape Design Approach (the LDA) has been made available for information purposes to demonstrate to the HS2 House of Commons Select Committee, local authorities and other interested parties HS2 Ltd's emerging approach to the development of landscape design along the HS2 line of route. The LDA is being produced to guide and direct professionals in the development of all landscape areas with the aim to achieve an integrated and contextually driven landscape design. The LDA takes into account good practice and has been subject to initial review by the HS2 Design Panel; including Sadie Morgan the Design Panel Chair, and Professor Kathryn Moore the President of the International Federation of Landscape Architects. The LDA embraces the wider HS2 vision and is a based on the principles as set out within the HS2 Design Vision.

The LDA is at an early draft stage and will be subject to change as HS2 nears the detailed design and construction phase. The final document may be more comprehensive and undergo a number of iterations before being finally adopted by the nominated undertaker.

Until the LDA has been approved in its final form for use, the information contained within it should not be considered as binding on the nominated undertaker.

The LDA itself should be viewed as distinct from the suite of documents that collectively form the Environmental Minimum Requirements although its application will contribute to many of the commitments contained within these documents.

The approach applied by the nominated undertaker will ensure that the design of any landscape areas will be of high quality and respond appropriately to social and economic aspects of the local environment, in accordance with HS2's Design Policy (outlined in Information Paper D1). At a local level, the relevant planning authority will be responsible for approving elements of landscape design, in accordance with Schedule 16 of the hybrid Bill. More detail on the planning approvals process is provided in Information Paper B1.

Cover image adapted from Millenium Park Chicago © Paul Tran

Introd

duction

Introduction

Purpose of this document

High Speed 2

The role of landscape design

Introduction

Purpose of this document

The purpose of this document is to provide an approach to the landscape design for HS2. The approach embraces the HS2 vision and reflects the project's commitment to great design. It presents the design aspirations for HS2, to ensure that the project can achieve its full potential through pre-construction and construction stages to post-construction management. It is envisaged that this guidance will be used by suppliers and design teams as well as for continuing stakeholder engagement.

The diagram opposite illustrates how this LDA is integrated with other HS2 design documentation and technical requirements. Together with HS2 Technical Standards and other HS2 Design Advice Documents, covering everything from ecology to architecture, to maintenance and operations, this guidance informs and underpins the LDA required for the project.

The images within this document have been selected to show good practice in a variety of different landscape design scenarios. They should not be taken literally but instead illustrate the design that HS2 aspires to.

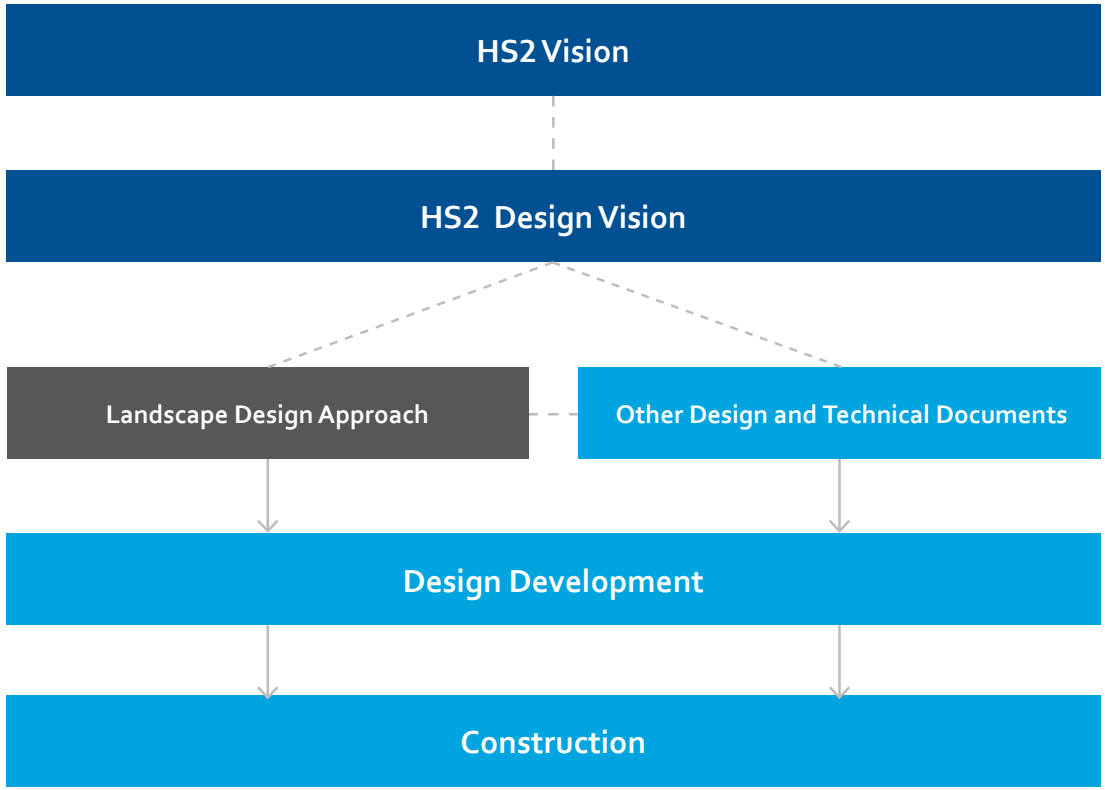

Diagram showing the context of the LDA in relation to other HS2 guidance and standards.

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Attractive landscape setting designed by TLA for an information centre within St Paul's Gardens © Arup

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HOC/10518/0008

Introduction

High Speed 2

HS2 represents the largest infrastructure project ever undertaken by the UK Government, and construction is expected to commence in 2017.

The purpose of this document is to provide an approach to the landscape design for HS2. The approach embraces the HS2 vision and reflects the project's commitment to exemplary design.

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HS1 tunnel portal and established tree and shrub planting near Thong Lane, Thong/ Cobham © Arup

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HOC/10518/0010

Introduction

The role of landscape design

'Our landscapes are extremely important to us, they are part of our cultural heritage. With sympathetic planning, design and management they offer an opportunity to provide a more harmonious link between man and the natural world, for the benefit of both. Sensitive, informed, and integrated approaches should help us all to conserve, enhance, restore and regenerate landscapes that are attractive, diverse and publicly valued, showing that environmental, social and economic benefits can go hand in hand.'

An Approach To Landscape Character Assessment

Natural England, 2014

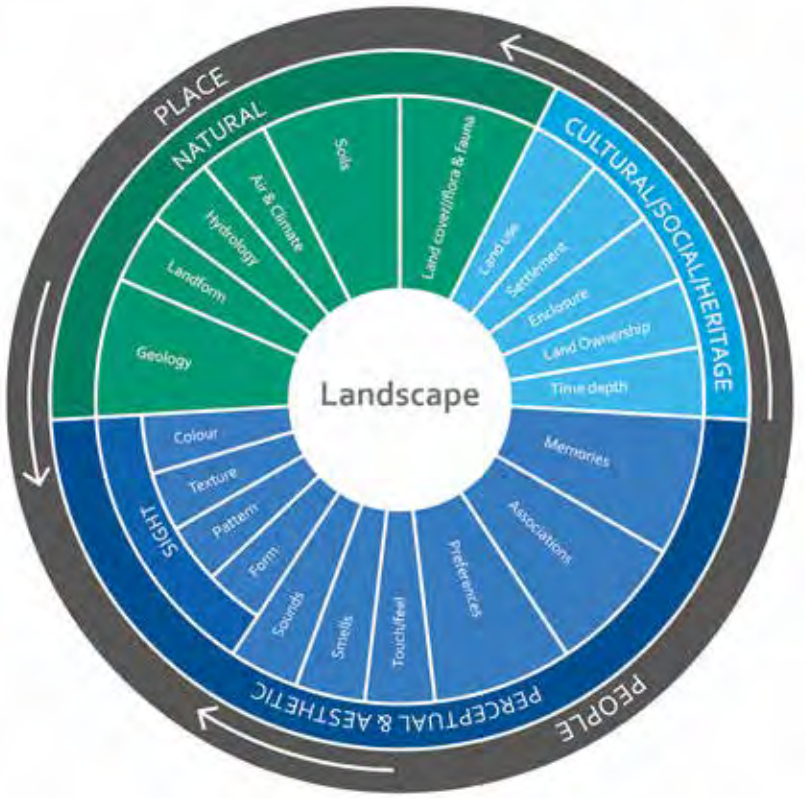

Diagram based on An Approach to Landscape Character Assessment,

Natural England, 2014

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The landscape design of HS2 is pivotal in helping realise the project vision. This is because it is the means to achieve a huge number and range of the aspirations for the project, including the creation of new landscapes that will help support economic growth.

The landscape design is intended to deliver the earthworks and planting networks that will be required to integrate, screen, set and/or celebrate the engineering design and architectural elements including buildings, structures and portals. The design will also provide the means to restore agricultural land, create new ecological habitats and features, appropriate settings for heritage features, and promote the integration of footpath, bridle and cycleway systems.

Not only can the creation of bold new landscapes help to deliver economic growth and transform public realm spaces for people but the future management of the railway landscape can also be a driver for innovation and local economic opportunity.

It is the landscape design that will provide the unifying design mechanism (the 'glue') to create a seamless and integrated scheme. Landscape design will be used to merge and consolidate the work and designs of other HS2 disciplines including engineering, architecture, ecology, noise, heritage and agriculture.

Landscape is a complex and all-embracing subject area and it is important in the introduction to these design guidelines to define it. The European Landscape Convention (ELC) definition of 'landscape' is:

'...an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.'[1]

Therefore landscape is not just about trees, but is more fundamentally about the complex relationship between people and place, which is a product of the interaction of the natural and cultural components of our environment, and how they are understood and experienced by people. Our landscapes are formed of the complex interrelationships between underlying geology, soils, topography, land cover, climate, weather and hydrology. Landscape also holds historical and cultural associations and specific perceptual and aesthetic qualities including people's memories and associations.

The HS2 landscape design will create a positive lasting legacy that responds to the landscape context, whilst also acting as a catalyst to support growth by delivering wide social, environmental and economic benefits. The challenge and opportunity will be for the landscape designers to deliver beyond 'business as usual' and set new standards of landscape design that will benefit many UK citizens and provide an exemplar for future infrastructure projects.

1 Council of Europe (2000), European Landscape Convention, Florence, October 2000

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HOC/10518/0013

Landscape vision

Landscape vision

Illustration

What landscape design success looks like

Design method

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Landscape vision

Landscape vision

Great design is at the heart of HS2. The HS2 Design Vision was developed to embrace the HS2 Vision -

'To be a catalyst for growth across Britain'

and provides the means to achieve it. It sets out three core design principles of people, place and time. 'People' relates to design for everyone to benefit and enjoy, 'Place' relates to design for a sense of place and 'Time' relates to achieving design to stand the test of time.

The landscape designers will adopt high levels of creativity and innovation in order to achieve an exemplar landscape design for the project that supports the HS2 vision. Designers will work from a thorough understanding of the urban and rural landscapes through which HS2 is planned.

Through continued engagement with communities and stakeholders the designers will develop a holistic design that delivers social, environmental and economic benefits supporting a positive, lasting legacy for the project that will act as a catalyst to drive growth.

HS2 is a project that will affect many communities, stakeholders and many landscapes. The HS2 Landscape Vision is based on the three core design principles relating directly to people, place and time.

E25 Ecobridge, Best nr. Eindhoven, Netherlands.

A great example of integrated design - with landscape acting as the unifying element to bring together engineering design and structures with ecological design.

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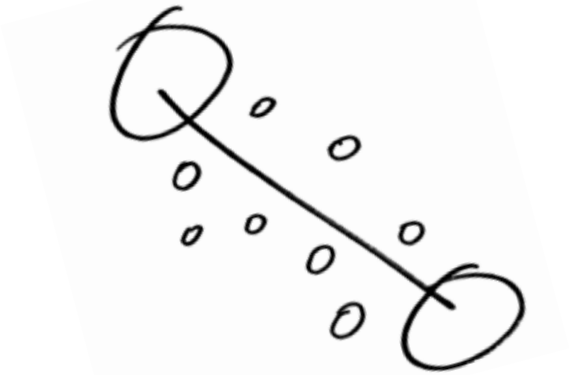
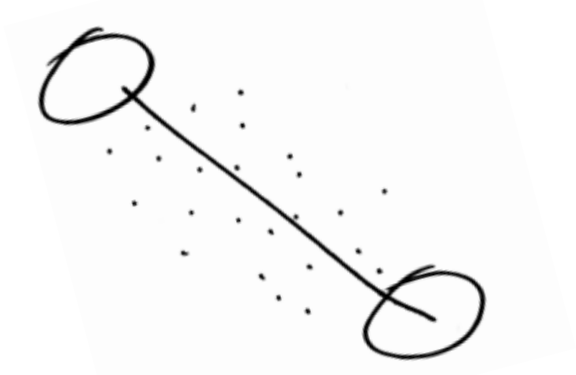
Landscape vision



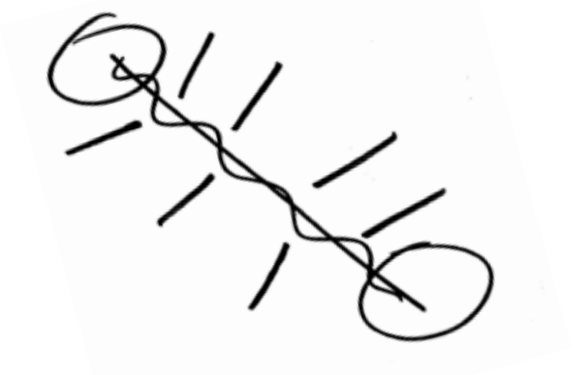
People

The landscape designers will continue to work with communities and stakeholders. The aim will be to understand their needs and aspirations, the local landscape context and the arising opportunities for social, economic and environmental benefits.



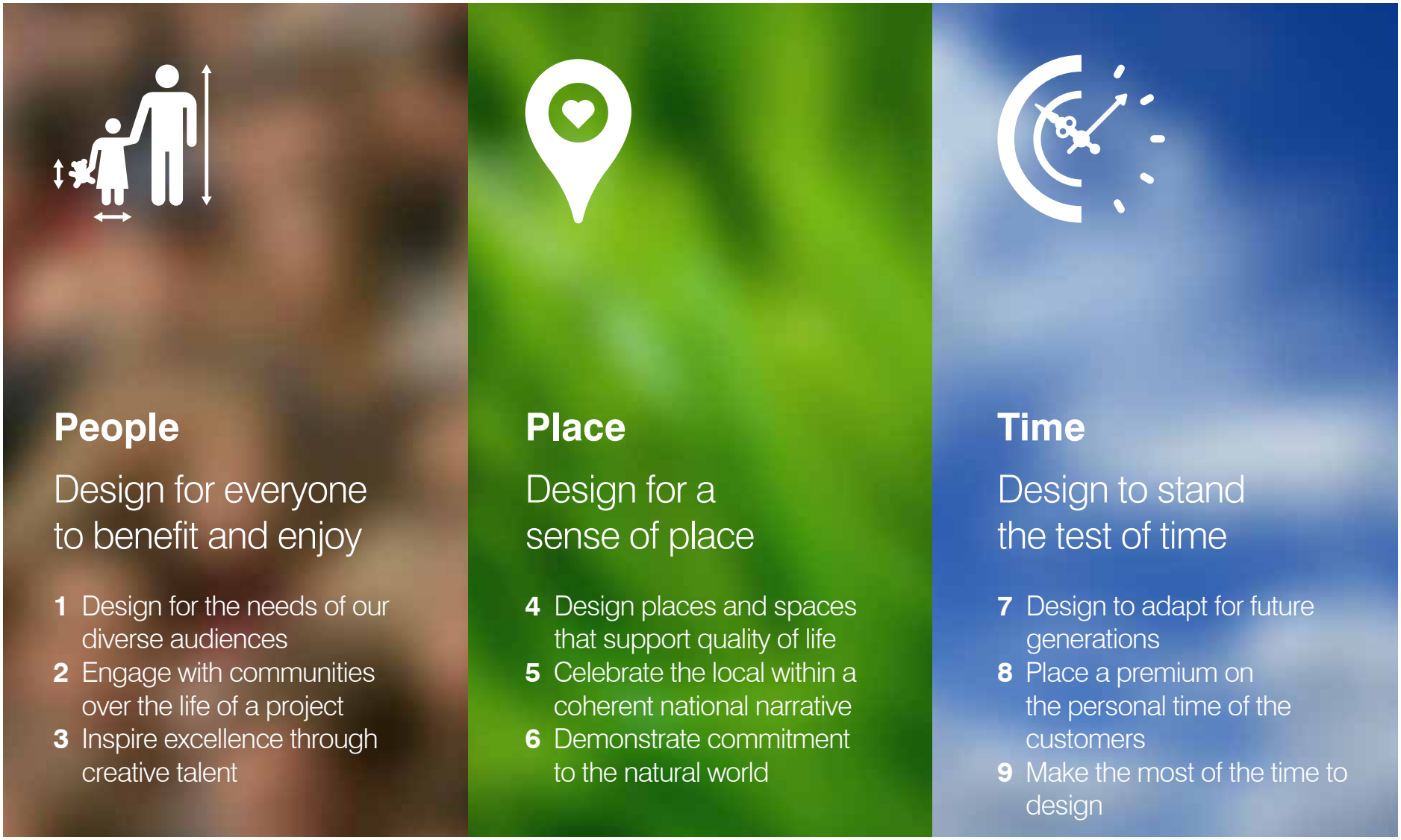
Place

The designers will work with the notion that each part of HS2 is an opportunity to achieve the wider benefits that the UK government is seeking to achieve. The landscape designers will deliver a coherent scheme for HS2, but one driven by local context along the length of the project, supporting quality of life and demonstrating environmentally sensitive design. Therefore, context will drive the different design responses required to achieve the project vision. In many places, this may be about conservation - the sensitive integration of HS2 into the local landscape supported by landscape restoration and enhancement design. In other places, local context will require the creation of bold new landscapes and public realm spaces that contribute to the regeneration of areas and communities, and boost economic growth.



Time

HS2 is an investment in the future - it is designed to provide quality transport for generations to come. This ambition is reflected in the 120 year design life of the project. The landscape designers will be committed to ensuring that the landscape components of the design are of materials that are built to last and wherever possible will enhance with age over time. The idea of timeless design sits well with the principles of contextual design - creating landscape and public realm designs that fit with, or enhance their surroundings, and will remain as an appropriate response throughout the project's lifetime. The HS2 landscape design will wherever possible, add beauty to the landscape - with management in place to ensure that the design will enrich and develop to provide continual enhancement of the landscape over time.



The HS2 Design Vision

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Landscape vision

Illustration

This vision drawing summarises (via the circular photos) the wide scope of requirements that the landscape designers will take forward. This includes delivering on global challenges such as climate change, health and well-being and also supporting community benefits, local economies and promoting sustainability, culture, biodiversity and art.

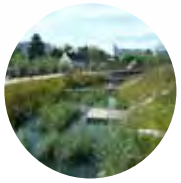
Although HS2 shall only be directly responsible for the landscape areas set within the hybrid bill limits, the landscape design has the opportunity to act as a driving force for the project by influencing the surrounding environments in a positive way and by providing opportunities to achieve the wider benefits as set out below.

Add landscape beauty


Green buildings


Habitat creation


Renewable energy

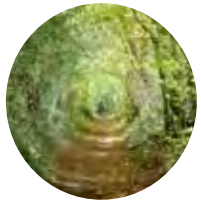

Sustainable water systems

Green infrastructure

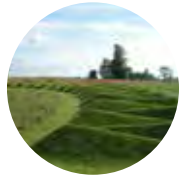

Natural play

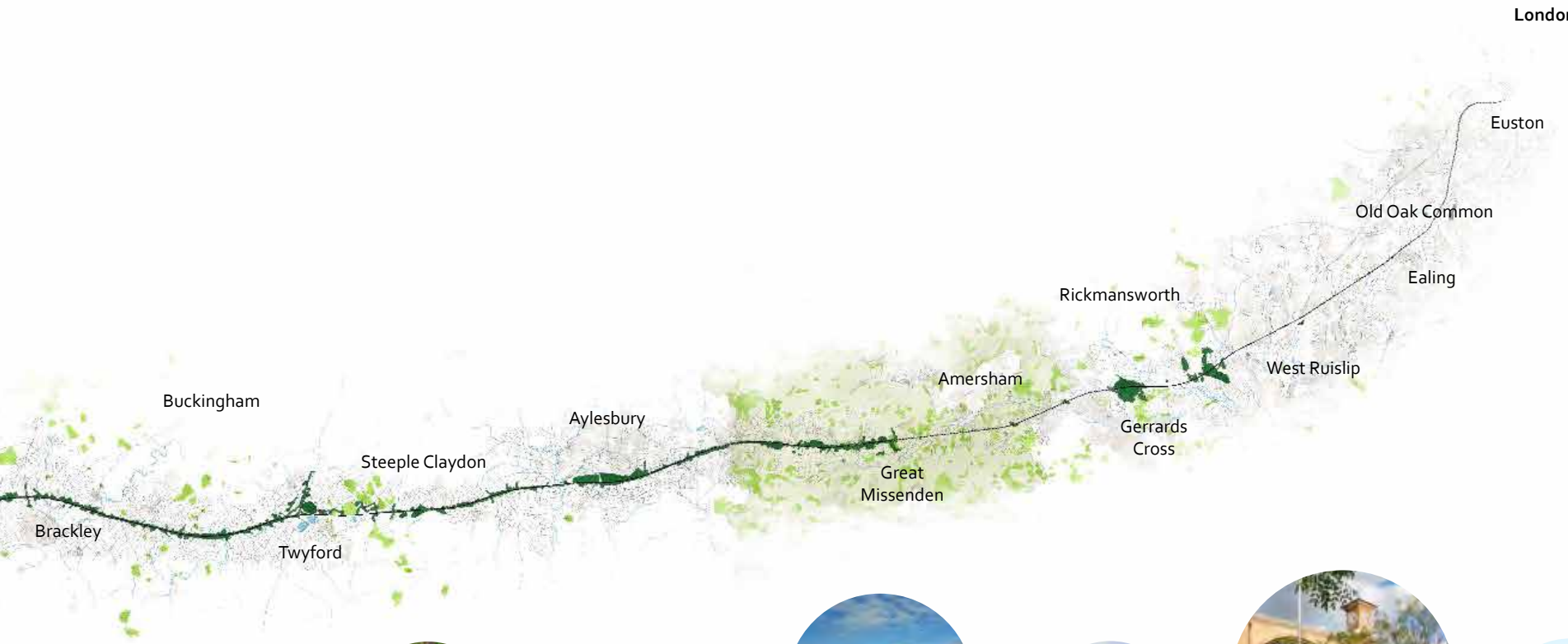

Seasonal change


New landmarks


Understand and respond to local landscape character


Creative management


Positive use of excavated materials



Create urban forests

Improve urban microclimates

Healthy networks

Collaborate with local development

Celebrate heritage

Create resilience and legacy

Sustainability

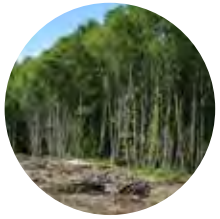
Local community collaboration

Celebrate views

Enhance agriculture

Support local economies

Positive integration of structures



New & traditional skills

Art, culture & entrepreneurship

Landscape vision

What landscape design success looks like

- The landscape design works intuitively and well for all audiences.
- The landscape design seamlessly integrates with the work and designs of all other HS2 disciplines including engineering, architecture, ecology, noise, and heritage.
- The design delivers landscape beauty wherever possible.
- The design provides environmental, social and economic benefits.
- All landscape design elements are built to last and are sensitive to their context.
- National pride in the landscape design is matched by a sense of local ownership.
- Small landscape elements and larger landscape design responses meet rigorous environmental standards.
- Collectively the landscape design adds to our cultural and natural heritage.
- The landscape designers have designed in the needs of the future including building-in resilience to the effects of climate change.
- Through effective management the HS2 landscape design will continually enhance the UK landscape as it evolves and matures over the project timescale.

HS1 is a good example of the benefits achieved when engineering meets landscape and ecology © Arup

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HOC/10518/0022

Landscape vision

Design method

As stated the basis of the HS2 landscape design shall be in its response to place. This is a well established principle for linear infrastructure projects.

Designers shall understand the project policies, commitments and undertakings already carried out as part of the parliamentary design. They shall aim to ensure that actual impacts of the construction and operation of the project, which have been assessed in the Environmental Statement (ES) will not be exceeded and shall use reasonable endeavours to further reduce any adverse environmental impacts insofar as this does not cause unreasonable costs to the project or unreasonable delays to the construction programme. The landscape design will be refined through all the future design stages to achieve these objectives.

Stakeholder and community engagement should be undertaken in a way which is consistent with the wider engagement strategy. It is acknowledged that stakeholders and local communities hold vital local landscape knowledge that will assist design teams in progressing successfully through the design stages. This continued design engagement will also help ensure that wider project opportunities e.g., for social cohesion, local economic development, biodiversity, climate change resilience, culture , spatial quality and reinforcing local landscape identity can be discussed, agreed and delivered as part of an integrated design approach.

Step 1: Understand the landscape (Character, Culture and Socio-Economics)

To better understand the landscapes of HS2 and inform future design and management decisions along the route this stage shall consider all relevant national , regional, county and local landscape character assessments (LCA). The HS2 ES and related cultural, social and economic studies shall also be reviewed. The expectation is that this work shall also be reinforced through site visit and landscape survey work to the route locations of HS2.

Step 2: Identify opportunities for landscape (Character, Culture and Socio-Economics)

Following an understanding of landscape character and the cultural, social and economic context of the route the main landscape constraints and opportunities for each study area can be refined. To reinforce this stage reference shall be made to the main landscape impacts reported in the HS2 ES. Further site visits shall also be undertaken in this stage to help verify the landscape opportunities.

Step 3: Develop integrated landscape design options

To achieve an integrated landscape design for the project designers shall liaise with HS2 and consultant teams: engineering, architecture, ecology, noise, agriculture, heritage, etc. This holistic approach will help create a culture of open working between disciplines.

This will help engender integrated design, where design ambiguity at design interfaces and potential design conflicts can be resolved. In addition it will allow mutual benefits to be created within the design (e.g., an earthworks substituting a noise barrier or flood storage as habitat creation).

Landscape can often act as the principle unifying design element on infrastructure projects, so the landscape designers shall need to take a proactive approach in seeking the best integrated design solutions. During this design stage the designers

shall work to the requirements of the HS2 technical design standards and other HS2 design advice as applies.

Step 4: Test options and refine parliamentary design

The design options shall be tested and refined in this stage, which may involve discussion with stakeholders and communities if this is consistent with the HS2 engagement strategy. The agreed design solutions can then be refined.

Step 5 to 7: Test and develop detailed design

The agreed landscape designs from Step 4 shall then be developed into detailed design, supported by production information and taken through to implementation and management.

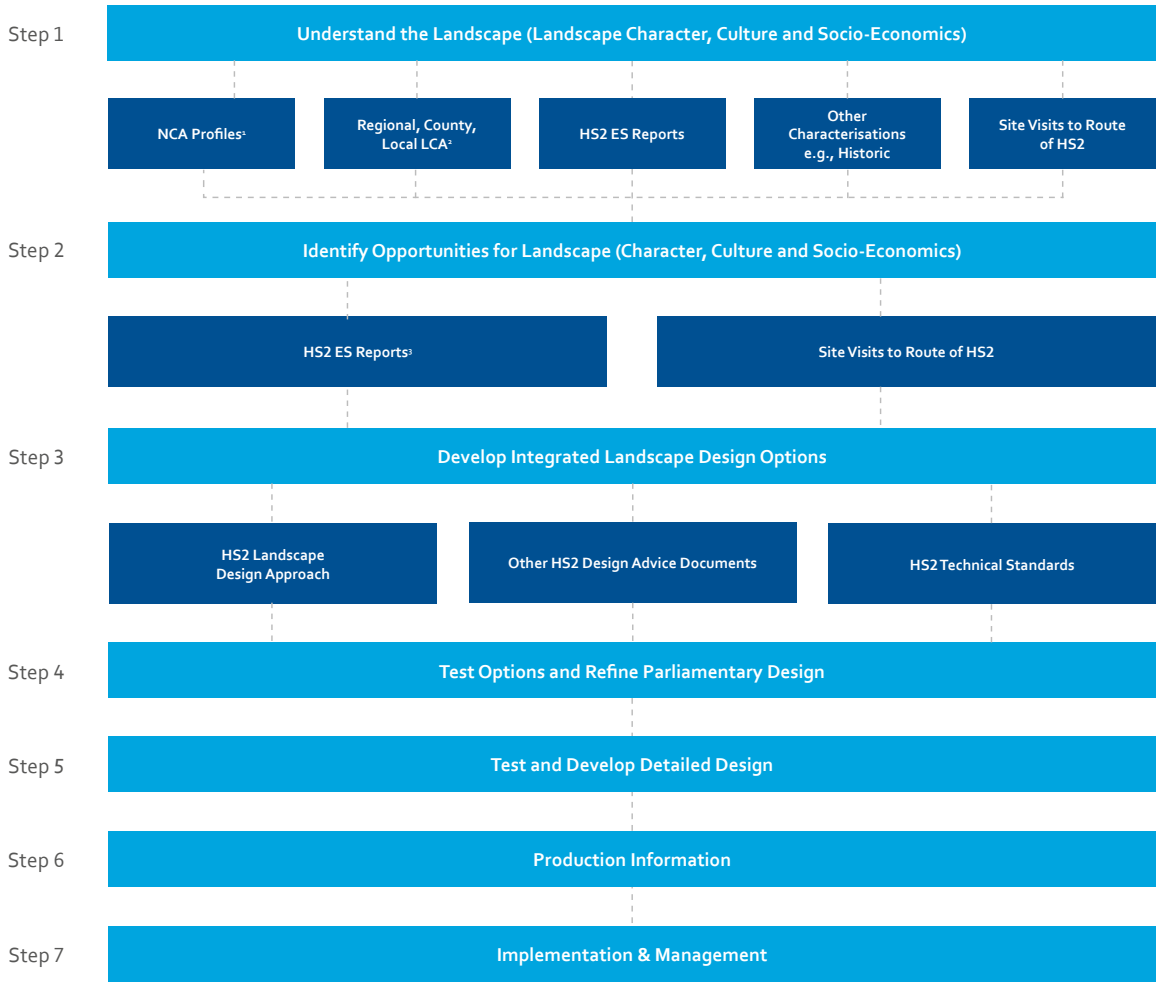

Diagram to right showing the methodology that will be followed to develop the HS2 landscape design.

¹NCA: National Character Areas / ²LCA: Landscape Character Areas / ³ES: Environmental Statement


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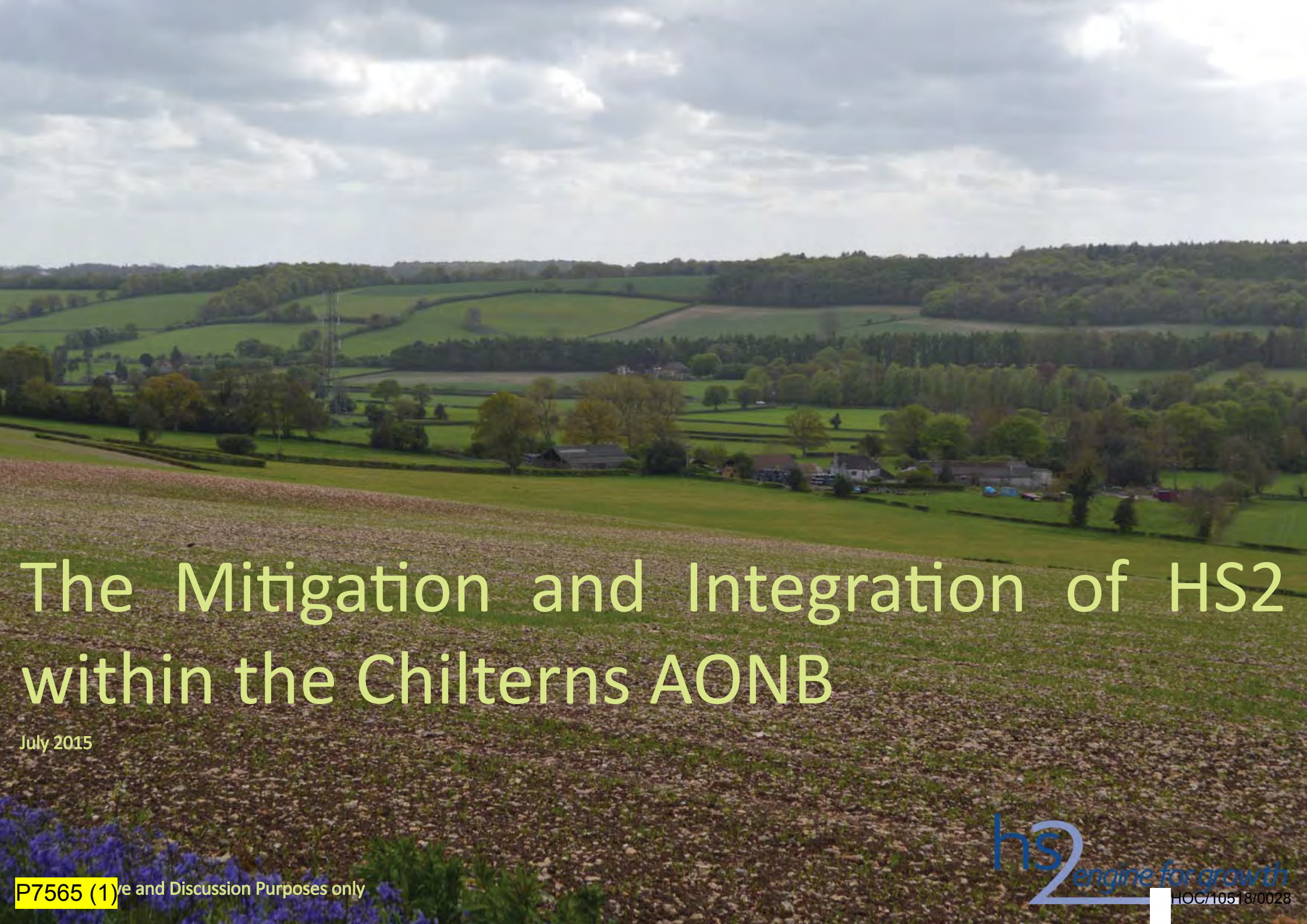


The Mitigation and Integration of HS2 within the Chilterns AONB

July 2015

P7565 (1)

ve and Discussion Purposes only

hs2 engine for growth

HOC/10518/0028

Document Title - The Mitigation and Integration of HS2 within the Chilterns AONB

C252-ETM-EV-REV-020-000002

Revision - 01 first draft

Author - ERM, Temple and Mott MacDonald

Date - 07/07/2015

Produced by:
Grant Sharman, Jo Morrison, Jeremy Purseglove, Ela Spurden, Colin Coupland and Chris Thomas.

Contents

1 - Introduction

This document provides information about the mitigation and integration of HS2 as it passes through the Chilterns AONB. The document is designed to support ongoing discussions with local authorities and key stakeholders about the effects of the Proposed Scheme on the Chilterns AONB and it should not be considered as binding on the nominated undertaker. The approach is in line with that set out in the draft Landscape Design Approach Statement (C263-ARP-DS-REP-000-000002 Condition A, June 2015).

Under Section 85 of the Countryside and Rights of Way Act 2000, public bodies are required to have regard to the purpose of conserving and enhancing the natural beauty of the area of outstanding natural beauty when "exercising or performing any functions in relation to, or so as to affect, land in an area of outstanding natural beauty". With this in mind the nominated undertaker would be expected to have regard to the purpose of conserving and enhancing the special character of the AONB when exercising its functions.

The report is an example of how HS2's Environmental Minimum Requirements (EMRs) could operate with the nominated undertaker using reasonable endeavours to adopt mitigation measures that will further reduce adverse environmental impacts caused by the Proposed Scheme (insofar as these mitigation measures do not add unreasonable costs to the project or unreasonable delays to the construction programme). The document is aspirational in that it also considers land outside Bill limits and has been prepared to aid discussion with stakeholders and landowners. At a local level the qualifying authority (normally the relevant planning authority) will be responsible for approving elements of landscape design, in accordance with Schedule 16 of the Hybrid Bill.

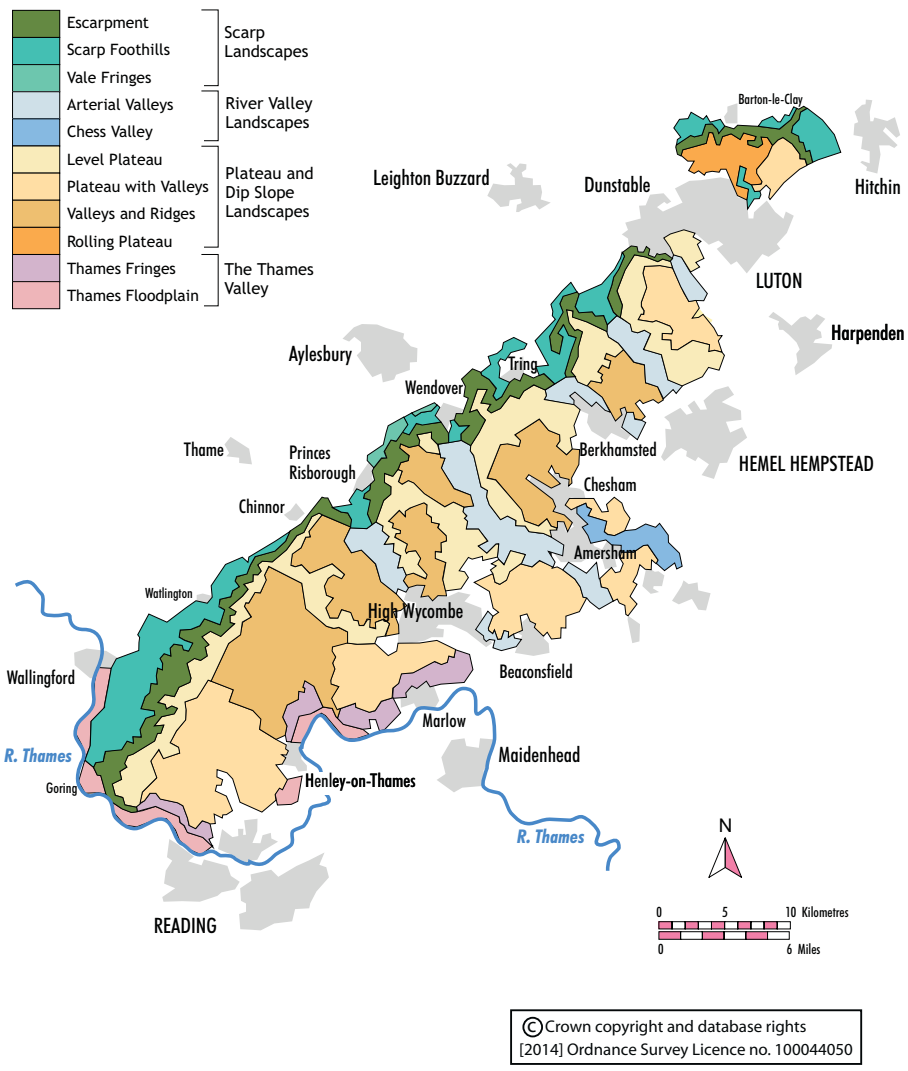
The route of HS2 crosses the Chilterns Area of Outstanding Natural Beauty (AONB) between Chalfont St Giles and Wendover. The railway will run under the AONB in tunnel for much of the route but it will be above ground in deep cutting between Hyde Heath and Wendover Dean, where it emerges above ground on viaduct and embankment for around 750m. It is in cutting again until Hartley's Farm (near Kingsash) where it again rises above ground level for about 2100m when it goes into green tunnel and cutting for the rest of the route through the AONB.

The environmental effects of the HS2 project in the Chilterns AONB were assessed in the main Environmental Statement: Volumes 2, 3 and 5 (2013). The assessment was updated for changes to the scheme in the AP1 ES (2014) and AP2 ES (2015) (in which the sustainable placement area at Hunts Green was removed from the Scheme). These assessments highlighted significant residual effects (significant effects remaining after all mitigation is applied) on landscape character and visual receptors during construction and operation of the railway.

The assessments predicted a number of significant effects on landscape character and visual amenity in CFA 8, 9 and 10 during construction, due to the scale of the construction works. The number of significant effects will decline when all construction is completed in year 1 of operation. This is partly because the construction plant, temporary roads and stockpiles and construction compounds will be removed; it is also because, in places, new landforms will be created which will immediately screen HS2 and its associated structures such as the tunnel vent shafts, substations and tunnel portals from some locations. By year 15 of operation, mitigation planting will be well established and most views of HS2 and its associated structures will be fully screened in winter and summer.

However, the presence of HS2 will still result in significant adverse effects on two landscape character areas (LCA) and a number of visual receptors after 15 years and it is these impacts that this report will concentrate on. The aim of the report is to remove, where possible, or reduce the significant impacts remaining after 15 years through planting and ground modelling. The report will also re-examine the existing mitigation already designed for CFA 8, 9 and 10 and highlight measures which could be developed to be more effective.

The Landscape Character of the Chilterns AONB

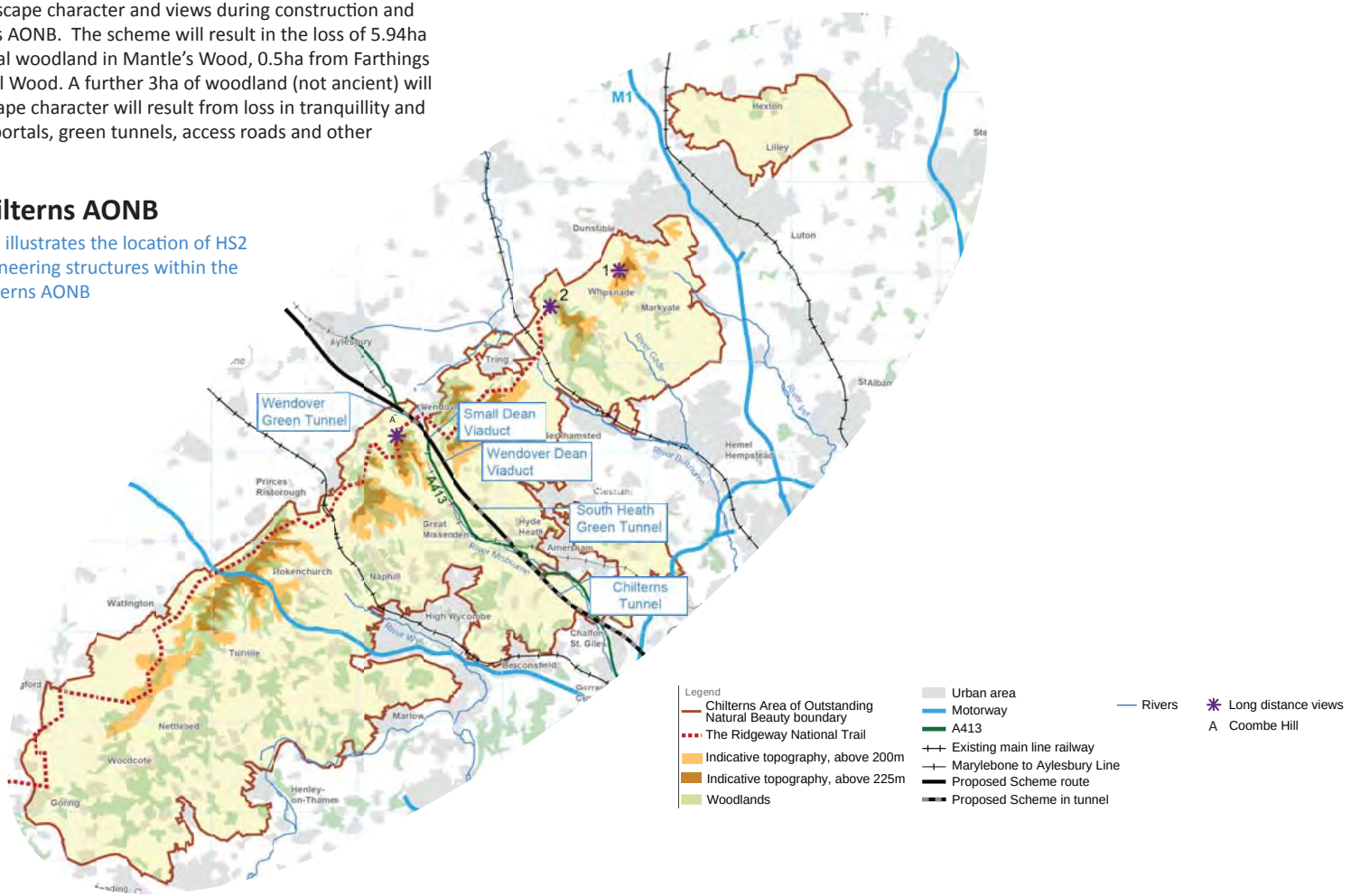


2 - Residual Effects

The main ES predicted adverse residual effects on landscape character and views during construction and operation, along the route of HS2 through the Chilterns AONB. The scheme will result in the loss of 5.94ha of ancient replanted woodland and ancient semi-natural woodland in Mantle's Wood, 0.5ha from Farthings Wood, 2.5ha of Sibley's Coppice and 0.7ha at Jones' Hill Wood. A further 3ha of woodland (not ancient) will be lost from Farthings Wood. Other impacts on landscape character will result from loss in tranquillity and the presence of the overbridges, head houses, tunnel portals, green tunnels, access roads and other associated

Chilterns AONB

Map illustrates the location of HS2 engineering structures within the Chilterns AONB



04 Sunken Lane

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3 - A Review of Current Guidance and Documentation Including the Chilterns AONB Management Plan and "A landscape-led approach to HS2"

The Chilterns AONB Management Plan

The Chilterns AONB Management Plan 2014 - 2019 describes the special qualities of the Chilterns, the key issues affecting them and sets out eighteen policies to inform development in the AONB. One of the key issues affecting the landscape is HS2. The plan describes the impact of HS2 in the Misbourne Valley as follows:

'The impact of High Speed 2 on the Misbourne Valley will be severe and permanent. At the time of writing the impact of the current design with a long section on the surface crossing two viaducts cannot be adequately mitigated. The proposal to provide screening by using spoil from the cuttings to create line-side embankments is not an appropriate design solution in an AONB. The loss of ancient woodland cannot be replaced by the proposed tree planting, much of which will be planted on farmland which should be kept in agricultural use.

Pasture and arable land in the AONB

Bluebells in Mantle's Wood

View south towards the Misbourne Valley from Mantle's Wood

3 - A Review of Current Guidance and Documentation Including the Chilterns AONB Management Plan and "A landscape-led approach to HS2" continued

A landscape-led approach to HS2 in Buckinghamshire and the Colne Valley

A landscape-led approach in Buckinghamshire and the Colne Valley to HS2 was produced independently by Land Use Consultants (LUC) on behalf of a stakeholder group comprising Wycombe District Council, Aylesbury Vale District Council, Chilterns District Council, Buckinghamshire County Council, Three Rivers District Council (in Herts), the Chilterns Conservation Board, the National Trust and the Colne Valley Community Interest Company. The report describes the key characteristics of the landscape character of the Chilterns, highlighting the dry valleys, folded slopes, hanging woodland on valley crests, ancient woodland on plateaux, sunken lanes, intact field patterns and long views over open valleys to wooded skylines.

The report lists a number of adverse landscape effects of HS2. Most are also identified in the main ES and the AP1 ES for HS2 except for the effects generated by the landscape mitigation proposed for the scheme. These were assessed in terms of their effectiveness in mitigating effects of the scheme only.

The landscape effects through the AONB highlighted by the LUC are:

- The smooth flowing contours of the valley sides will be damaged by cuttings and embankments, deposits of fill materials, false cuttings and environmental bunds;
- There will be a loss of tranquillity due to noise, train movements and during construction;
- The diversion of rights of way along engineered service roads will reduce the enjoyment of the Chilterns;
- The local landscape patterns of historic fields and woodland and the landscape setting of historic buildings will be disrupted;
- Historic sunken lanes that stitch together the landscape of the Misbourne Valley will be lost;
- Large scale blocks of woodland in proposed mitigation planting do not relate to the local pattern and grain, cutting across and obscuring dry valleys; and
- The local landscape patterns of historic fields and woodland and the landscape setting of historic buildings will be disrupted.

Sunken Lane north of
Upper Wendover Dean Farm

The landscape of the
Misbourne Valley

3 - A Review of Current Guidance and Documentation Including the Chilterns AONB Management Plan and "A landscape-led approach to HS2" continued

The landscape effects highlighted by the LUC at specific locations are:

- The Chalfont St Giles vent shaft, Little Missenden vent shaft and associated infrastructure will visually express the line in tunnel and urbanise the rural lanes that access the shafts;
- The Chiltern tunnel north portal and associated buildings, access roads and earthworks will destroy the rural character of Mantle's Wood and Wendover;
- There will be a loss of ancient woodland at Mantle's Wood, Farthings Wood, Sibley's Coppice and Jones' Hill Woods;
- The character of ancient lanes such as Bowood Lane and Leather Lane will be harmed by the Wendover Dean viaduct and the requirements of construction traffic;
- The Wendover Dean viaduct and the Small Dean viaducts will dominate long views along and across the valley;
- The extensive earthworks south of the Wendover Dean auto transformer station (ATS) and north of Upper Wendover Dean Farm and the drainage and balancing ponds proposed are completely uncharacteristic of the dry valley; and
- The placement of fill materials on the valley sides and crest at Hunts Green will alter the distinctive smooth chalk landform and wooded skylines of the AONB.

Pasture land including a historic borrow pit surrounded by trees

Dry valley south of Mantle's Wood in arable use

4 - The Mitigation and Integration of HS2 within the Chilterns AONB

HS2 Ltd commissioned a review of the landscape effects and mitigation measures proposed in the main ES and AP1 ES. This report brings together the findings of that review, which were informed by the AONB management plan and the LUC report, to establish the locations of particular concern in the AONB. This report also responds to the letter from Natural England (27th February 2014) written in response to consultation on the HS2 ES. During the preparation of the main ES HS2 Ltd, the issue of severance of agricultural land was also explored and the finding of this work has also been reviewed for this report.

The report proposes potential additional or amended mitigation, which could be delivered through wider discussions and agreement, with interested stakeholders to reduce the permanent effects of the scheme at a number of locations. The changes to the existing proposed mitigation aim to restore and strengthen the existing landscape character of the Chilterns AONB, guided by the AONB management plan and the county and district landscape character assessments for the area. It should be noted that some of these areas are outside the current Bill limits and land likely to be owned by the project, so will need to be delivered via negotiations.

The AONB management plan describes the special qualities of the Chilterns; those most relevant to the landscape HS2 passes through are:

- The central and southern Chilterns are dominated by heavily wooded countryside with mixed farming and a large number of scattered villages and hamlets;
- Woodlands, notably beech, cover over 18,000 hectares, nearly 22% of the AONB, making it one of the most wooded landscapes in England;
- Farmland covers approximately 60% of the Chilterns, creating a mosaic of fields with arable crops and livestock, bordered by ancient hedgerows and trees. Mixed farming was once commonplace, but grazing of livestock is less prominent now and more land is given over to arable farming;
- The folds of the landscape hide many small dry valleys or coombs. These places provide hidden 'secret' landscapes and unspoilt countryside; and
- The Chilterns has an extensive network of ancient routes, roadside hedges and sunken lanes.

The AONB management plan lists a number of key landscape issues relevant to the landscape HS2 passes through:

- Changes to farming include the conversion of short term grass leys to arable, reduction in livestock farming and the increase in 'hobby' farming which can lead to fragmentation of land and new fences and buildings;
- There is a continuing fragmentation of the landscape by transfer to smaller holdings which is affecting the scale and management of land. The links between fragments of chalk grassland or ancient woodland are important to allow wildlife to move around a larger network of suitable habitat;
- Removal of conifers, from ancient and semi-natural woods will help restore their natural qualities. The impacts of climate change and the maturity of many beech woodlands may result in long term changes in the woodland landscape. Beech will persist in smaller pockets but it will no longer be as dominant. The balance of woodland cover needs to slowly change to reflect the tolerance of species to more extreme weather; and
- Impact of HS2 as described above.

Mantle's wood - ancient replanted woodland

Leather Lane looking towards Misbourne Valley

Mantle's Wood - woodland flora

4 - The Mitigation and Integration of HS2 within the Chilterns AONB continued

The LUC report proposes key landscape principles to inform the design of the landscape mitigation in the Chiltern AONB. These are:

- Do not place fill materials or plant woodland where they would obscures the chalk landform/topography of the dipslope, ridges, dry valleys and coombes;
- Maintain the pattern of woodland cover along the steep valley sides and plateau top;
- Maintain the small scale landscape structure and pattern of co-axial and other historic field patterns;
- Restore the character of the distinctive lanes and holloways that climb the valley sides to the higher plateau land, conserve these or replace them with new holloways;
- Retain local tranquillity, distinctive built vernacular and rural character including a setting for historic buildings;
- Minimise the severance of rights of way and avoid unnecessary lengthy diversions; maintain the overall countryside experience along diverted routes and existing connectivity;
- Minimise the effects of water attenuation features on the dry valley character of the area through good design;
- Avoid unnecessary fragmentation of farm holdings by both the line and associated mitigation;
- Ensure all above ground structures and ground works are designed to integrate with their particular context and setting;
- Minimise effects of additional infrastructure such as fencing, signage and access roads; and
- Use green bridges, to maintain habitat connectivity and reduce landscape and visual impacts of crossing points.

The mitigation outlined in the main ES already take into account many of the above design principles. The potential mitigation described in this report aims to further reduce the number of significant residual landscape and visual effects in operation on the Chilterns AONB. In doing so, the potential mitigation also addresses some of the key issues highlighted in the AONB management plan. Not all areas identified for mitigation in this document are within the current CCB and would be developed through detailed negotiation with land owners, farmers and other stake holders.

Leather Lane - bank vegetation

Pasture fields near to Hobbs Hole

10

View west from King's Lane across Misbourne Valley

P7565 (12)

HOC/10518/0039

P7565 (13)

HOC/10518/0040

5 - Potential Mitigation in the Chilterns AONB

The potential mitigation described in this report aims to reduce the number of significant residual landscape and visual effects in operation on the Chilterns AONB (this is in addition to mitigation measures already detailed in the main ES). This report brings forward more detailed consideration of mitigation that could address key issues highlighted in the AONB management plan. Earthworks such as bunds and embankments could be designed to integrate in a more natural manner with the existing contour characteristics of the AONB. The new woodlands could reduce the fragmentation of ancient woodland by linking these; ancient woodland species would gradually colonise the newly planted woodlands adjacent. New woodlands would start to mature as existing mature woodlands decline and a wider species mix would increase the robustness of the new woodland to resist climate change. The mitigation identifies the potential conversion of a number of arable fields back to pasture and the restoration of sunken lanes, bordered by hedgerows at the end of construction. The network of hedgerows bordering fields could be strengthened with new hedges, perhaps replacing hedges removed in the 20th century during to the conversion of pasture to arable. New woodland blocks could be planted along the valley sides, following the contours, and on the plateaux top. The locations of particular concern described in the AONB management plan and the LUC report, the cause of the effect and the potential new mitigation or changes to mitigation already proposed in the ES are listed in the tables.

The development of the potential mitigation was guided by the draft HS2 Landscape Design Approach (C263-ARP-DS-REP-000-000002 Condition A) produced in June 2015.

Potential mitigation table 1.1 (reads from south to north)

Scheme elements giving rise to significant residual effects (grouped by location)	Location	Cause of the Effect	Potential Mitigation within the Chilterns AONB
Chalfont St Giles vent shaft at Hobbs Hole (CT 06 26)	1	Presence of vent shaft building, hard standing and security fencing, permanent widening of Bottom House Farm Lane	• Retain larger proportion of the woodland copse north-east of the vent shaft and ATS to reduce the visibility of the scheme from the north-east during year 1 of operation. • Building design to fit character. • Alter shape of planting already proposed west of the vent shaft to follow the existing contour. • Plant robust new hedges along a widened Bottom House Farm Lane. • Retain the land form of the dry valley north west of the vent shaft.
Amersham vent shaft	2	Presence of vent shaft building, hard standing and security fencing	• Strengthen existing hedgerow south-east of the vent shaft.
Little Missenden vent shaft (CT-06-030b)	3	Presence of vent shaft building, hard standing and security fencing	• Plant woodland block south of Keeper's Wood to link existing woodland blocks.
Chiltern tunnel north portal (CT-06-031)	4	Presence of portal structure, portal building, access roads, railway cutting and loss of ancient woodland at Mantle's Wood. Mitigation planting crossing dry valley. Landscape earthworks (altering landform).	• Remove proposed woodland planting crossing the dry valley south of the Chiltern tunnel north portal. Instead plant woodland to follow the 'shoulder' of the slope on the eastern edge of Farthing's Wood. Retain the dry valley and convert back to pasture from arable. • Plan woodland in arable field south of Mantle's Farm to offset reduced area of proposed woodland south of the tunnel portal. • Divert PRoW LMI/17 east to allow screen planting east of the portal cutting and plant woodland belt along both sides of the PRoW. • Remodel earthwork mound east of the portal so that it merges more naturally into the existing contours of the arable field. • Plant woodland block in arable field between Mantle's Wood and Hyde Heath Road to offset reduced area of proposed woodland south of the tunnel portal. • Strengthen woodland edge between the western side of Mantle's Wood and the dry valley. • Improve integration of balancing pond into landscape.

Mitigation key plan and photo locations (reads from south to north)

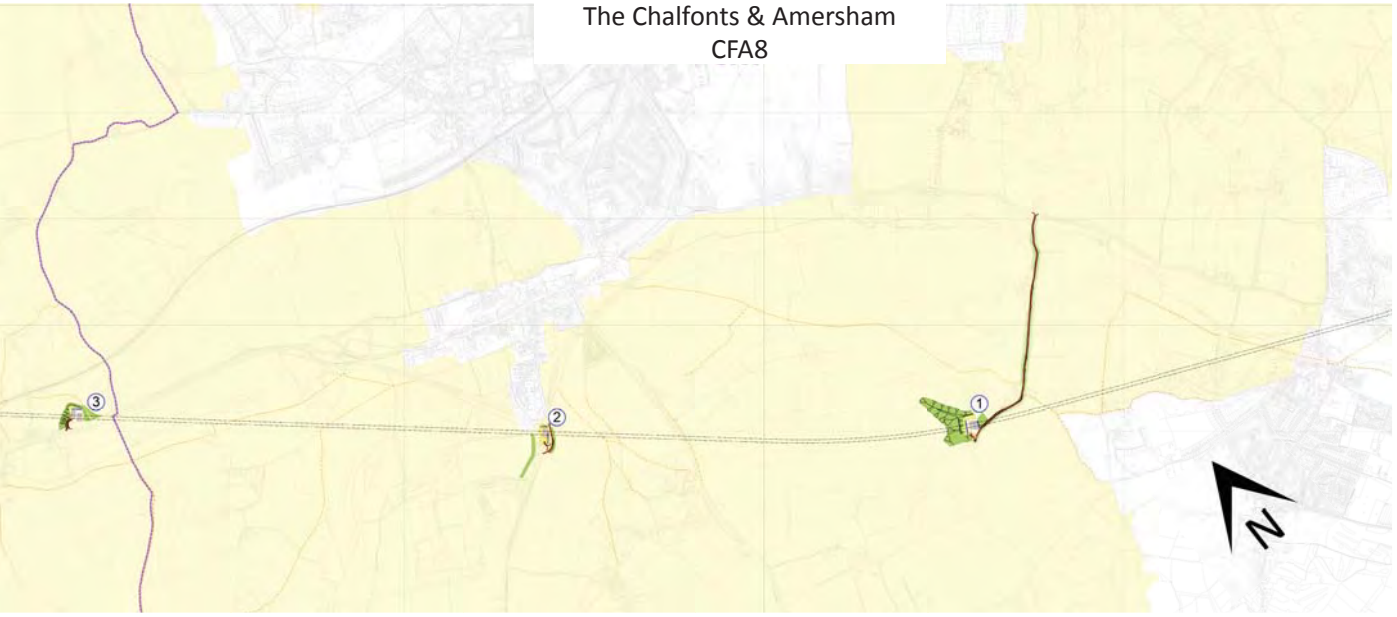
5 - Potential Mitigation in the Chilterns AONB continued

Potential mitigation table 1.2

Scheme elements giving rise to significant residual effects (grouped by location)	Location	Cause of the Effect	Potential Mitigation within the Chilterns AONB
Hyde Lane and GMI/27 over-bridges, eastern portal of South Heath green tunnel and (CT-06-032)	4	Presence of portal structure, portal building, access roads, balancing ponds, railway cutting and loss of ancient woodland at Farthing's Wood. Landscape earth-works (altering landform).	• Additional woodland planting along the north side of HS2 to link Mantle's Wood and woodland planting proposed by Chesham Road. • Remodel landscape earthworks west of the Hyde Lane overbridge with gentler slopes, to blend in with the existing contours. • Plant additional woodland south of HS2 between Farthing's Wood and Chesham Road on earthworks remodelled to merge more naturally with existing contours. • Improve integration of balancing pond into landscape and surround with new woodland to reduce prominence in the landscape.
South Heath green tunnel and western portal , ATS and GMI/12 over bridge (CT-06-033)	5	Loss of ancient woodland at Sibley's Coppice and Jenkin's Wood and presence of tunnel portal building, ATS, over bridge and access roads	• Plant new woodland in severed land parcels north and south of the green tunnel and adjacent to Sibley's Coppice.
Hunt's Green Farm sustainable placement (CT-06-034a)	6	Sustainable placement altering landform	• The sustainable placement area at Hunts Green has been removed. The AP2 ES (2015) assesses the effects of deleting the Scheme on landscape character
Leather Lane, GMI/12 and GMI/2 overbridges (CT-06-034b)	6	Presence of over bridges and the realignment of Leather Lane and track to east	• Retain existing planting and flower rich sunken lane along Leather Lane up to the overbridge • Plant new woodland belt along north side of the cutting to integrate retention ponds into the landscape • Plant woodland blocks in severed land parcels on the south side of the line and east and west of the Leather Lane overbridge embankments. • Soften slopes of the landscape earthworks north of the land to merge more naturally with the existing contours • Plant new hedges and strengthen existing hedges along field boundaries

Potential mitigation table 1.3

Scheme elements giving rise to significant residual effects (grouped by location)	Location	Cause of the Effect	Potential Mitigation within the Chilterns AONB
Wendover Dean viaduct and the railway cutting (CT-06-036)	7	Presence of viaduct, landscape earthworks (altering landform) and balancing ponds.	• Plant woodland blocks, following the contours between King's Lane and the viaduct • Reduce area and soften slopes of the landscape earthworks north and south of the line to merge more naturally with the existing contours • Plant new hedges and strengthen existing hedges along field boundaries, maintaining long views across the Misbourne valley
Wendover ATS, Rocky Lane underbridge and Small Dean viaduct (CT-06-037)	8	Presence of ATS, underbridge, landscape earthworks (altering landform), viaduct and balancing ponds.	• Plant new hedges with standard trees and strengthen existing hedges along field boundaries, maintaining long views across the Misbourne valley • Redesign long balancing ponds and plant woodland belts around them to improve integration into the landscape • Plant woodland blocks in severed land parcel around the Rocky Lane underbridge and north of the green tunnel
Grove Farm underbridge, Wendover green tunnel east-ern portal (CT-06-038)	9	Presence of portal structures, portal buildings, access roads, balancing ponds and realignment of Bacombe Lane	• Plant woodland block in severed land parcel around the realigned Bacombe Lane and green tunnel portal • Improve integration of balancing ponds with additional plant and ground modelling • Soften the slopes of the landscape earthworks over the green tunnel to merge with the existing contours • Plant new hedges and strengthen existing hedges along field boundaries
Wendover green tunnel western portal and Nash Lee Road overbridge (CT-06-039)	10	Presence of portal structures, buildings, the cutting, landscape earthworks (altering landform) and the realign-ment of Nash Lee Road.	• Plant woodland block in severed land around the green tunnel portal and south of the realigned B4009 Nash Lea Road



Legend

Mitigation locations

Photo locations

6 - Photographs Taken within the Chilterns AONB

Photo locations are shown on the maps on Pages 12 and 13.

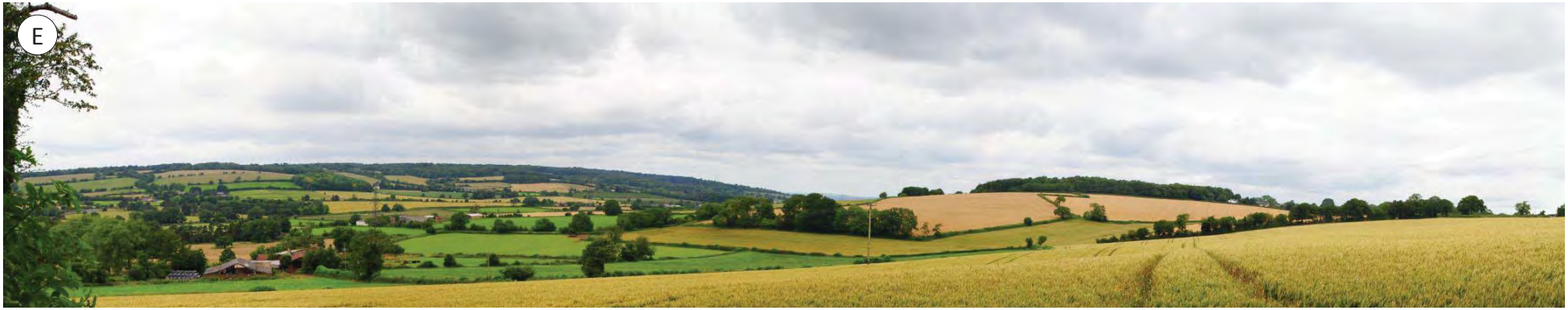
View west along Leather Lane : an example of a sunken lane, typical of the Chilterns AONB

View east from South Bucks Way PRoW near Cockshoots Wood : illustrating the mosaic of arable fields and pasture, bordered by ancient hedgerows

View east from dwellings on London Road, Wendover Dean : woodland covers nearly 22% of the AONB

View west from PRoW on Bowood Lane : a sunken lane borders arable fields, with woodland blocks in the distance

View north-west from the PRoW near Kingsash : the pattern of the landscape is created by the network of hedgerows and hanging woodland on higher ground



View south-west from dwellings at the junction of King's Lane and Rocky Lane, Kingsash : arable farming is gradually replacing mixed farming in the Chilterns AONB

View south-west from Rocky Lane, near Kingsash : the intricate field patterns of the Misbourne Valley with hanging woodland is characteristic of the AONB
The large scale fields of the foreground illustrate more modern farming methods

P7565 (18)

View east from Bacombe Hill : illustrating the mosiac of arable land pasture, woodland, hedgerows and settlement, typical of the Chilterns AONB

View north-east from the summit of Coombe Hill : illustrating the mosaic of arable land pasture, woodland, hedgerows and settlement, typical of the Chilterns AONB and Aylesbury Vale

View north-west from PRoW, near Kingsash - Photomontage of proposed Wendover Dean Viaduct

Photomontage reference: ES, Volume 2, Map Book, CFA10, Dunsmore, Wendover and Halton - Doc number: C250-ARP-EV-PHO-000-001045-P01

P7565 (20)

HOC/10518/0047

View south west along dry valley at the edge of Mantle's Wood

P7565 (21)

HOC/10518/0048

7 - Environmental Mitigation Earthworks Design

Proposed earthworks are designed to integrate with existing contours and landform characteristics of the undulating landscape including dry valleys and valley slopes.

Engineered earthworks

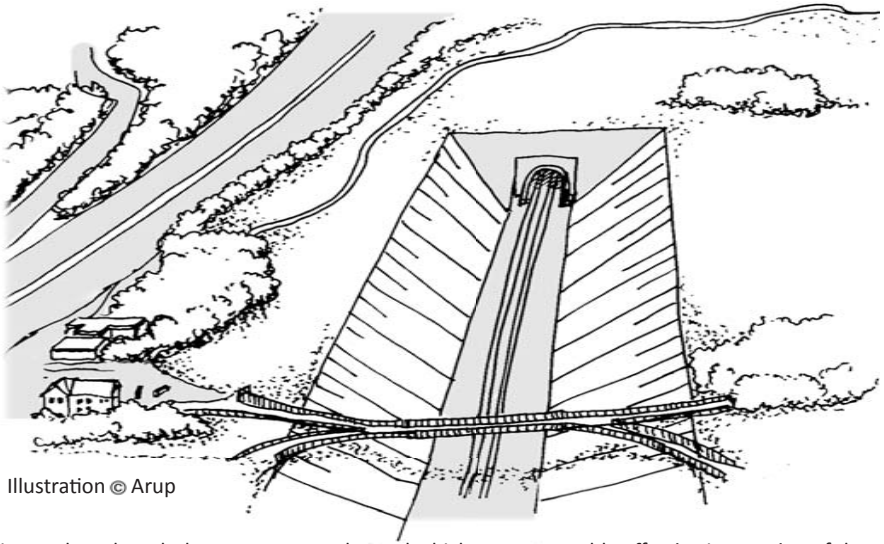


Illustration © Arup

Illustration of engineered earthwork slopes to proposed portal which may not enable effective integration of the Proposed Scheme within the AONB.

Landscaped earthworks

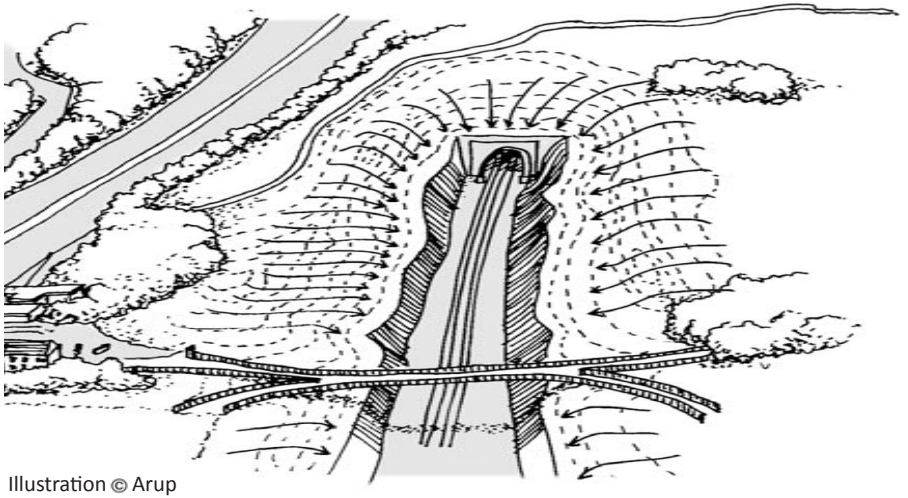


Illustration © Arup

Illustration of improved integration of proposed portal, through sympathetic earthworks design which follow the existing contours and have more natural contoured embankment slopes.

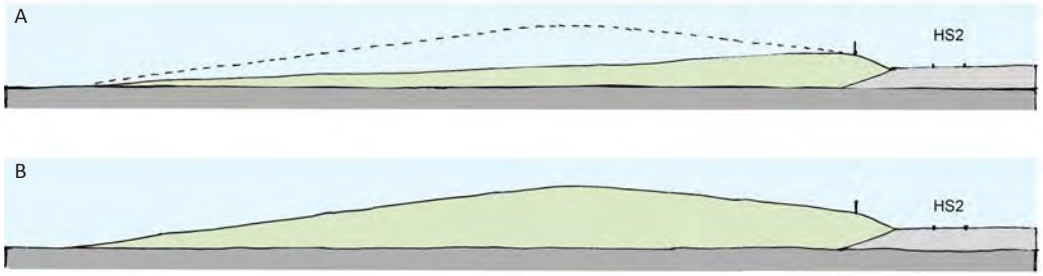


Illustration © Arup

Option A is illustrative of earthworks effectively screening views of the Proposed Scheme but is not always the most appropriate method of integrating the scheme.

Option B is illustrative of effective screening of views of the Proposed Scheme and also improves integration of proposed earthworks within the AONB.

P7565 (22)

HOC/10518/0049

7 - Environmental Mitigation Earthworks Design continued

Illustration © Arup

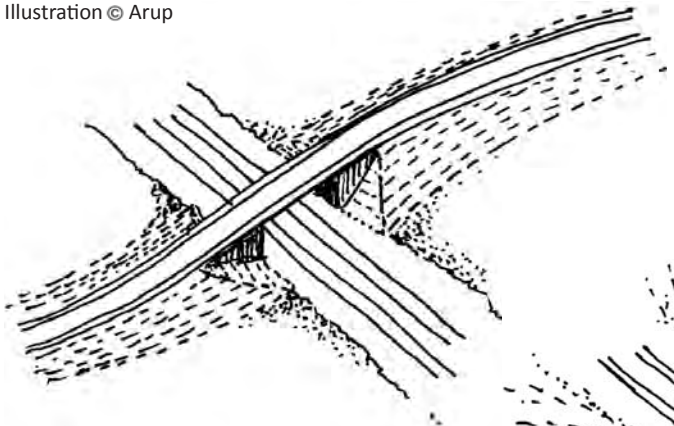


Illustration of basic overbridge engineered earthworks

Illustration © Arup

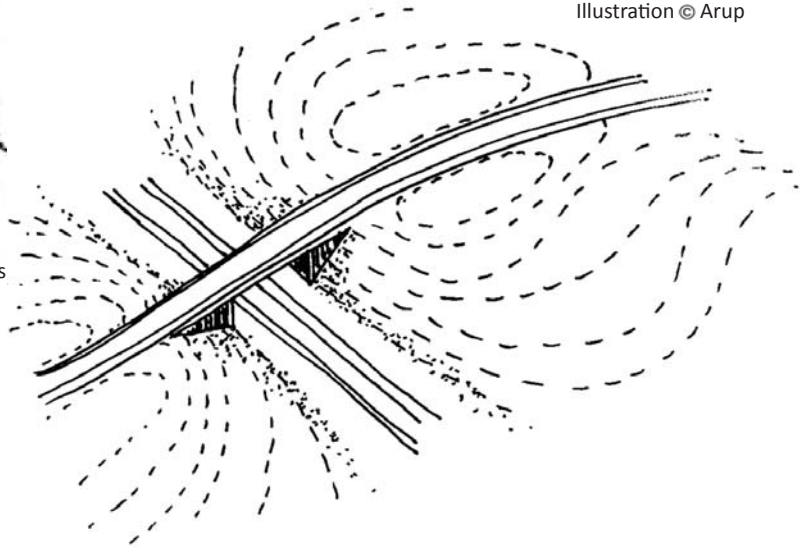


Illustration of further integration of the Proposed Scheme overbridges through more gentle earthwork embankments

Illustration © Arup

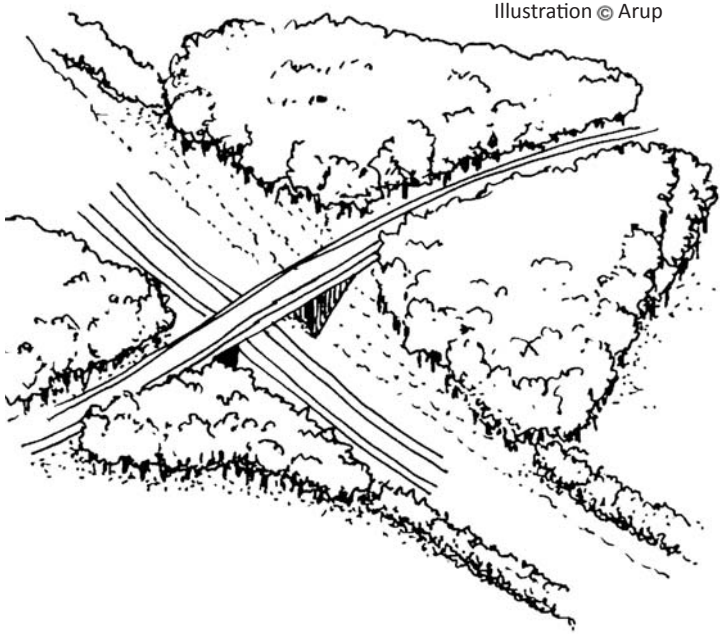


Illustration of further integration of the Proposed Scheme overbridges through the introduction of continuation of severed field patterns and small woodland copses. These aim to screen views of the overbridges and break up the line of the route.

P7565 (23)

Mantle's Wood bluebells

8 - Ancient Woodland

The AONB comprises an extensive wooded and farmed landscape underlain by chalk bedrock, covering an area of more than 80,000ha. Approximately 17,000ha of the AONB (21%) is wooded and, of this, roughly 11,000ha is defined as ancient woodland. Ancient woodland, particularly beech, is a distinctive feature of the hill tops. The larger expanses of woodland are commonly located on the higher ground, on the valley slopes, and along the elevated plateaux in between the valleys. Towards the valley bottoms, such as in the Misbourne Valley, smaller, rectilinear areas of woodland have been shaped by agricultural practice over time.

The Proposed Scheme will result in the removal of ancient woodland (5.94ha at Mantle's Wood, 0.5ha at Farthings Wood, 2.5ha at Sibley's Coppice and 0.7ha at Jones' Hill Wood). A further 4.8ha of woodland, not classified as ancient woodland, will also be removed as part of the scheme. Although these losses represent a small proportion of the woodland 0.09% in the AONB, they are nonetheless a characteristic feature and, in the case of ancient woodland, irreplaceable. Of the woodlands affected, Mantle's Wood is partly ancient woodland and partly ancient replanted woodland, Farthing's Wood is ancient replanted woodland and both Sibley's Coppice and Jones Hill Wood are ancient woodland.

The mitigation planting set out in the main ES includes around 50ha of new woodland. This is intended to replace areas of lost woodland, link existing woodland blocks, to integrate the linear alignment of the Proposed Scheme into the landscape and screen it from view.

Ancient woodland is classified as woodland that has existed since 1600AD (when reliable maps began to appear) but it can be much older and pre-dates the time when woodland planting became common. Ancient woods have developed over long timescales: the communities of plants and animals found in them depend on the stable conditions ancient woodland provides. Indicator species include wild garlic, dog's mercury, bluebells and sweet woodruff (present in Mantle's Wood and Farthings Wood). Indicator features include mediaeval boundary banks and old coppice stools (also present in the woodlands affected by the Proposed Scheme).

The Proposed Scheme acknowledges that ancient woodland cannot be created through planting, but it is possible, through careful new planting, to create the conditions that would allow species found in ancient woodland to gradually colonise new woodland. Correct tree and shrub planting with species such as oak and ash, together with hazel sub-storey would mimic the ecological community present in the woods. In time the ground flora, including bluebells, dog's mercury and sweet woodruff, would colonise from the adjacent woods and could also be introduced. Birds and animals present in the ancient woodland would colonise more quickly. Over the years the woodland flora and fauna would slowly develop greater complexity as trees mature and a woodland understorey develop. Potential new woodland could be established on farmland, typically used for cereal crops in consultation with land owners and farmers. The new woodland could help redress the balance between cereal crops and semi-natural habitat in the landscape.

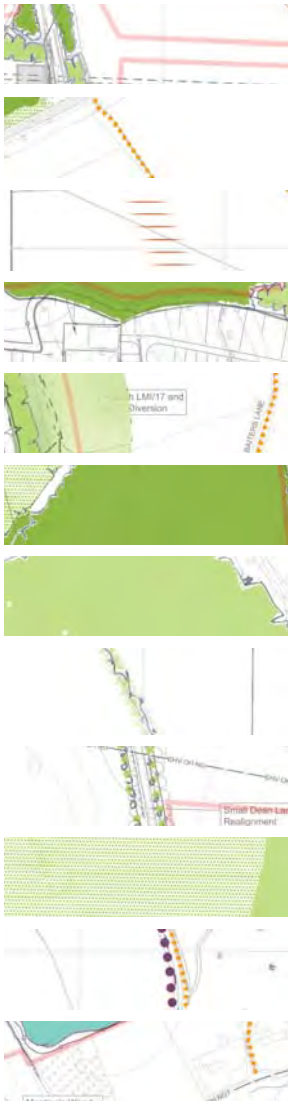
The potential mitigation set out in this document could protect the ancient woodland not affected by development and by planting 50ha of new woodland, could compensate for the 15ha to be removed, increasing the total area of woodland in the Chilterns, a key characteristic of the AONB. The woodland mitigation could include:

- Planting new woodland blocks on poorer quality farmland adjacent to existing ancient woodland. This would allow species to gradually colonise the new woodland.
- Connecting woodland blocks severed by past clearance for farming. This would increase the overall wood land size and in doing so improve the viability of the woodland habitat.
- Careful selection and sourcing of plant material, using species present in the existing woods such as beech, hornbeam, hazel and whitebeam.
- Gradual thinning, with landowner approval, removing forestry conifers in the ancient replanted woodland.

9 - Plans Illustrating Potential Mitigation

The next section covers plans for the route as it passes through the AONB and identifies potential mitigation which could be taken forward through discussion with local authorities and key stakeholders. The plans are for illustrative and discussion purposes. These include: Hyde Lane and South Heath green tunnel south portal, Leather Lane, Bowood Lane and Wendover Dean viaduct false cuttings. The potential mitigation shown is in places outside the CCB and would be subject to negotiation with land owners, farmers and stakeholders.

Legend



Land potentially required during construction

PRoW

Dry valley

CT-06 drawing

Landscape earthworks

Existing woodland

Potential woodland

Strengthening hedgerows

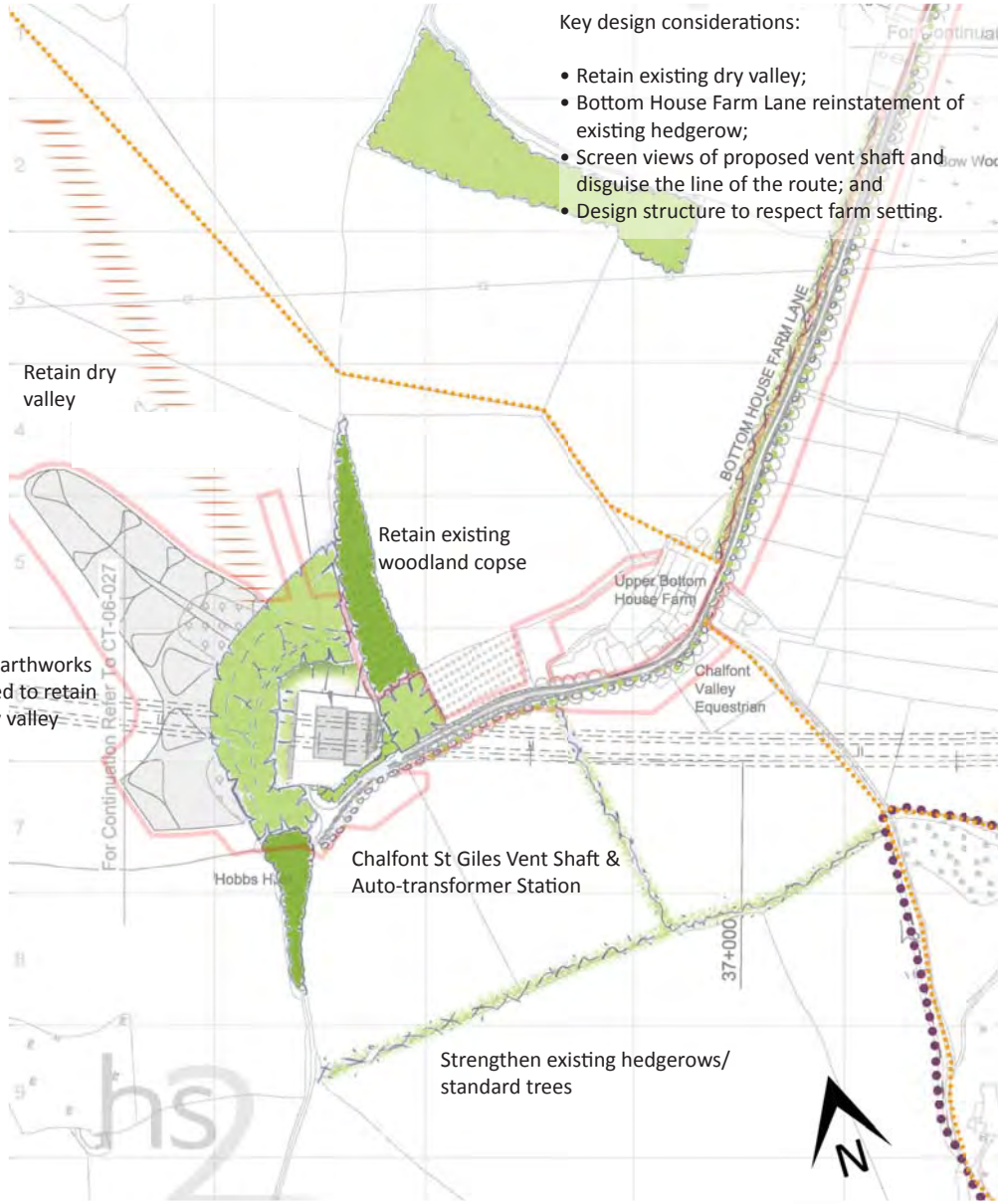
Potential hedgerows

Grassland habitat creation

AONB boundary

Existing contours

Chalfont St Giles Vent Shaft & Auto-transformer Station - Bottom House Farm Lane, Chalfont St Giles



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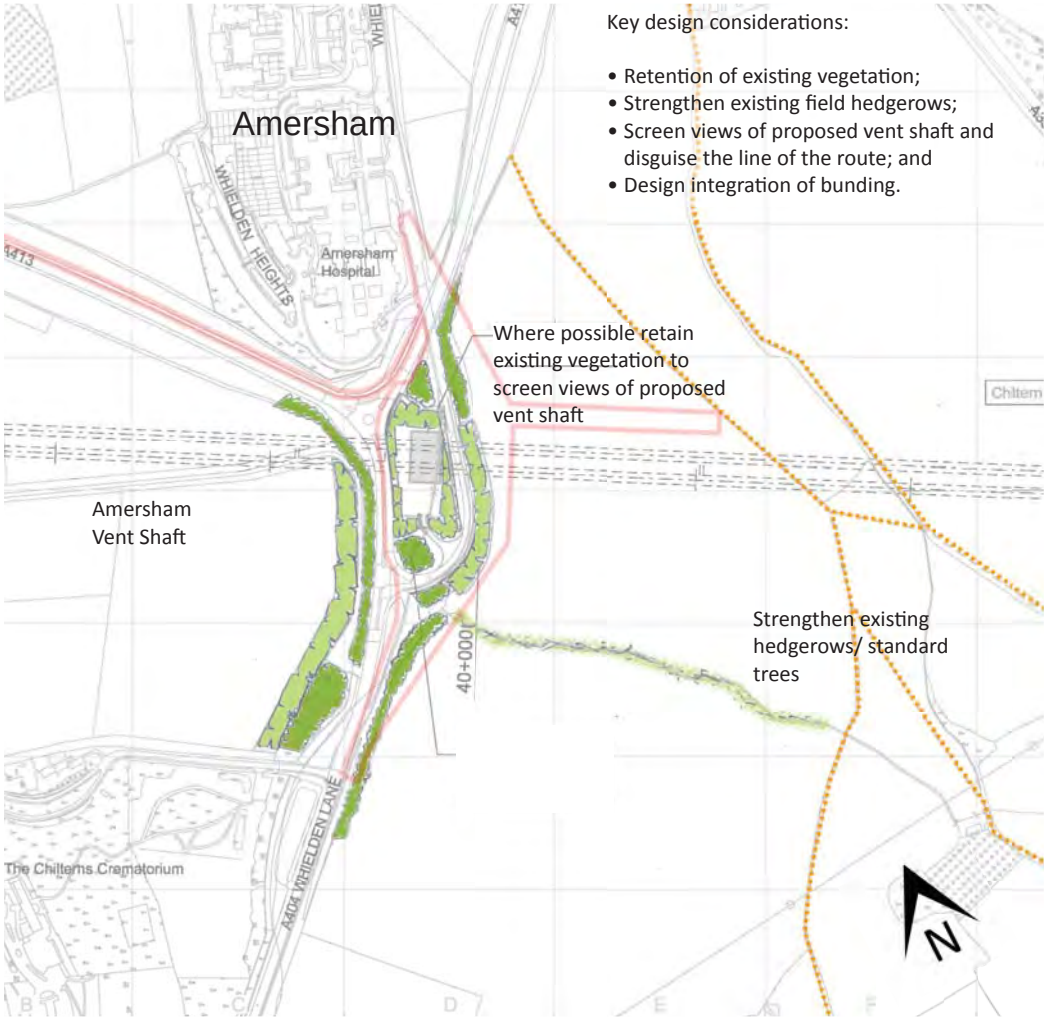
Amersham Vent Shaft, Vent Shaft



Key design considerations:

- Retention of existing vegetation;
- Strengthen existing field hedgerows;
- Screen views of proposed vent shaft and disguise the line of the route; and
- Design integration of bunding.

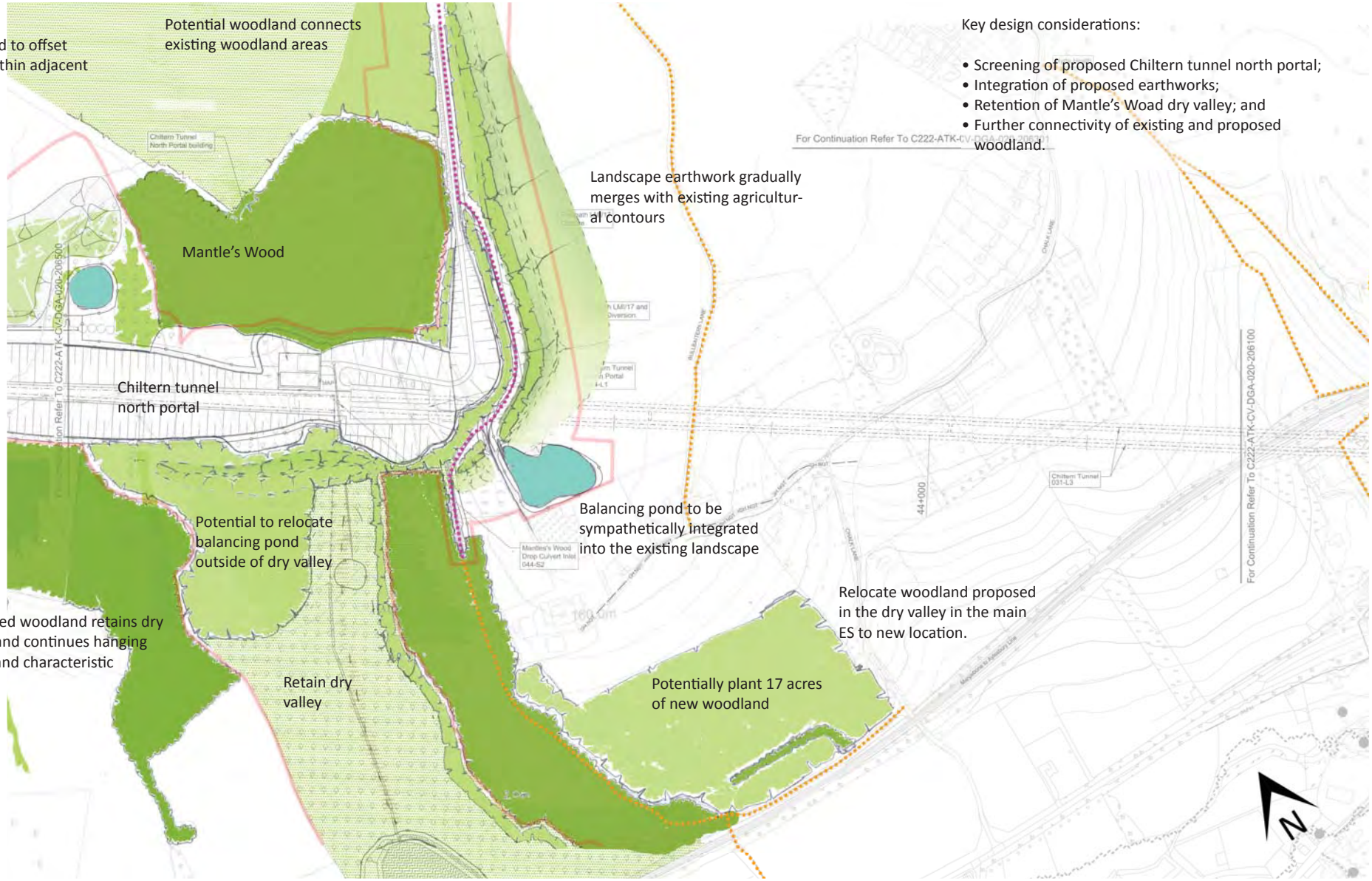
Little Missenden Vent Shaft and Auto-transformer Station

Key design considerations:

- Retention of existing vegetation;
- Retention of dry valley;
- Potential woodland within severed agricultural land;
- Screening views of proposed vent shaft and disguise the line of the route; and
- Design integration of bunding.

P7565 (27)

Chiltern tunnel north portal, Mantle's Wood



P7565 (28)

Chiltern tunnel north portal to South Heath Green Tunnel

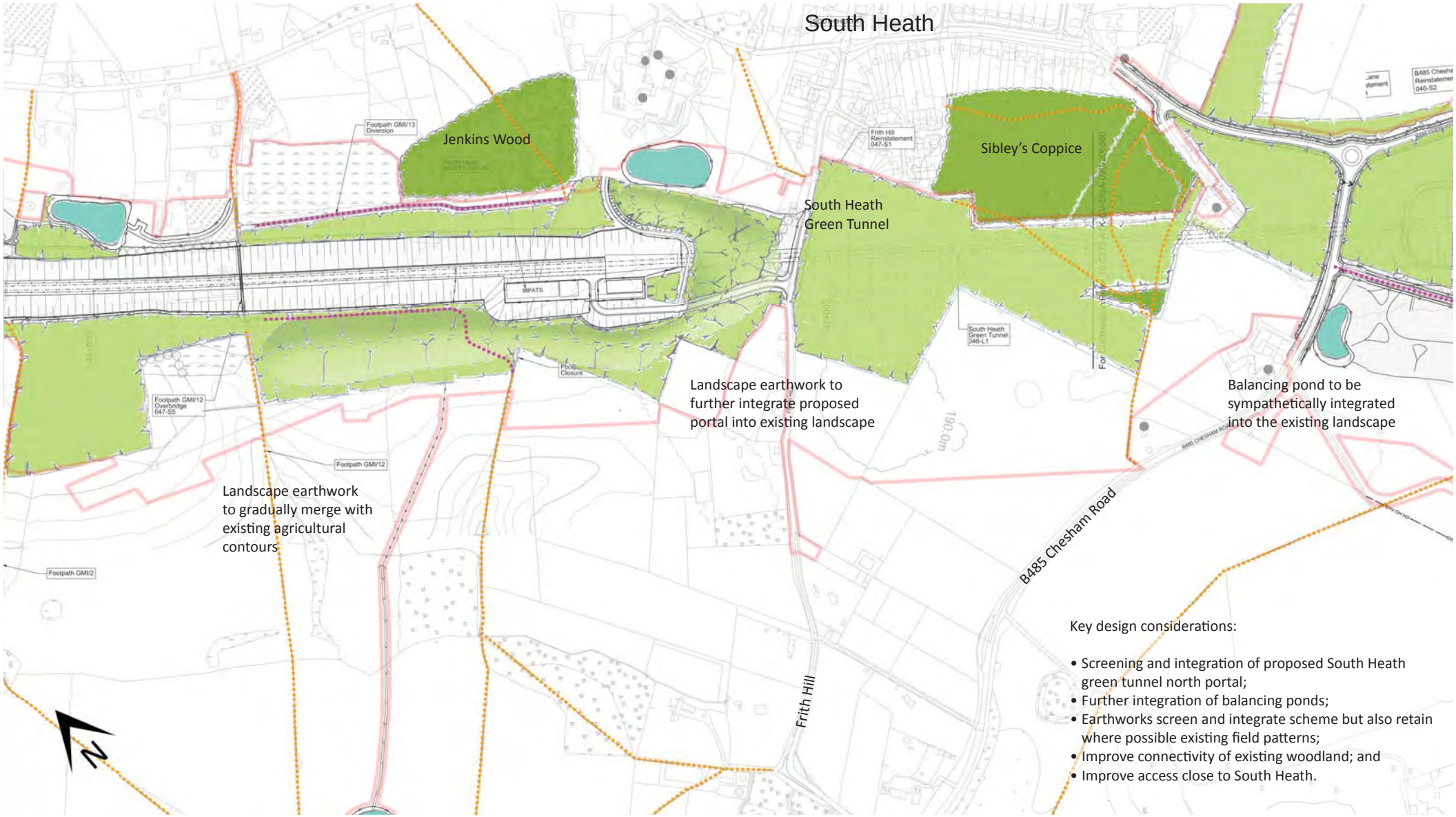
Key design considerations:

- Screening and integration of proposed South Heath green tunnel south portal;
- Further integration of balancing ponds; and
- Earthworks screen and integrate scheme but also retain where possible existing field patterns.

P7565 (29)

HOC/10518/0056

South Heath Green Tunnel to Potter Row



Key design considerations:

- Screening and integration of proposed South Heath green tunnel north portal;
- Further integration of balancing ponds;
- Earthworks screen and integrate scheme but also retain where possible existing field patterns;
- Improve connectivity of existing woodland; and
- Improve access close to South Heath.

P7565 (30)

Potter Row to King's Lane

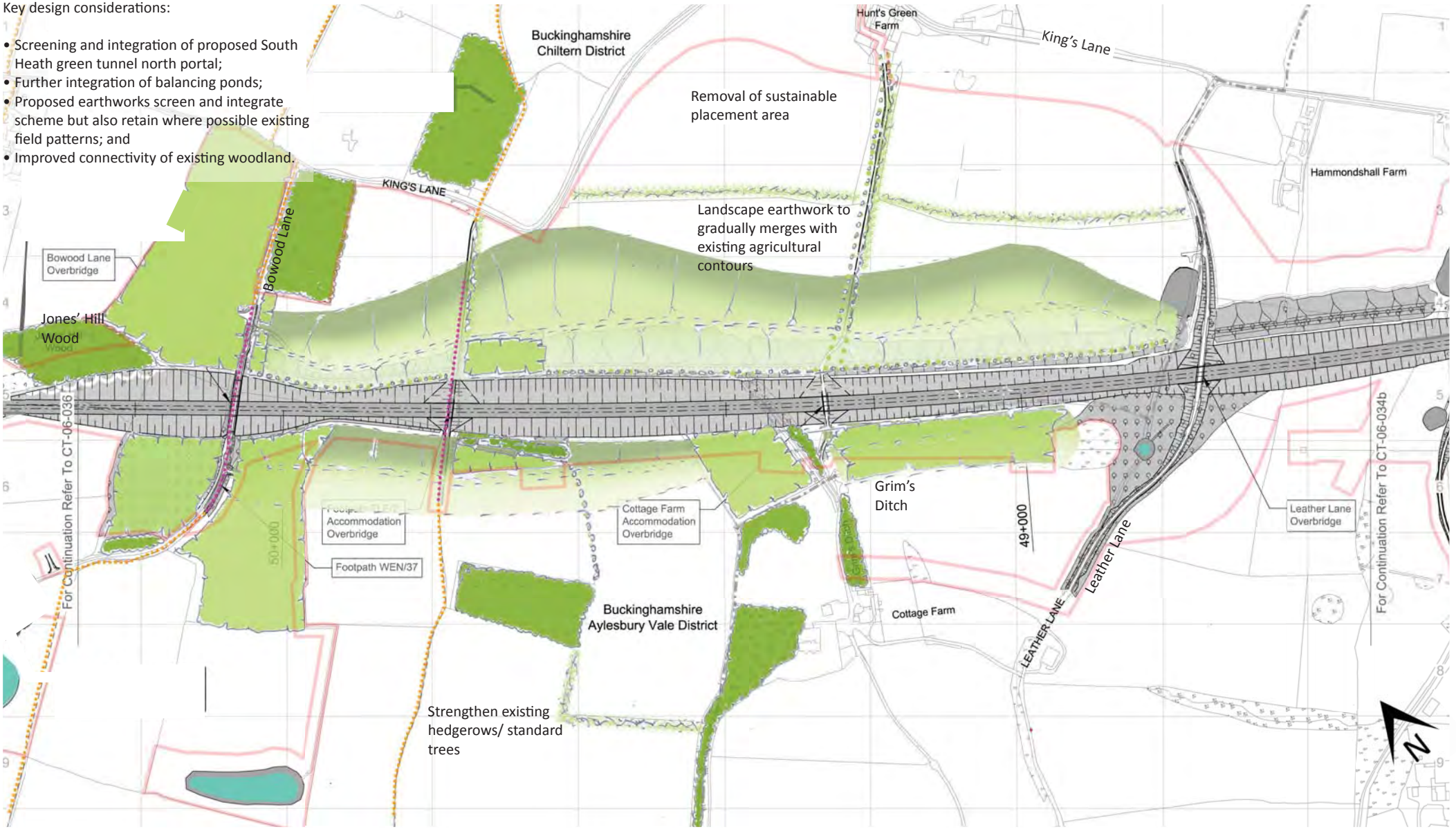
P7565 (31)

HOC/10518/0058

King's Lane

Key design considerations:

- Screening and integration of proposed South Heath green tunnel north portal;
- Further integration of balancing ponds;
- Proposed earthworks screen and integrate scheme but also retain where possible existing field patterns; and
- Improved connectivity of existing woodland.



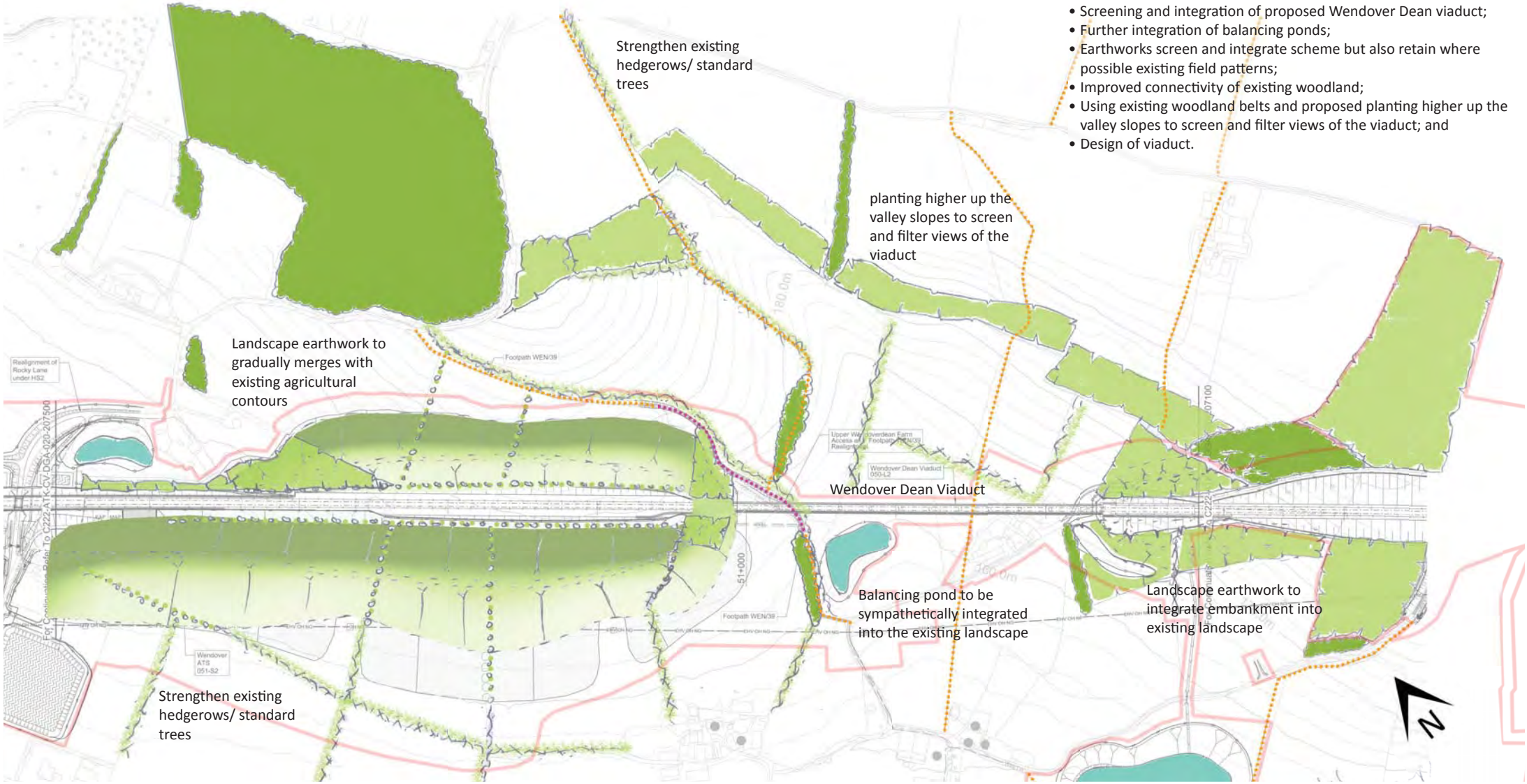
P7565 (32)

HOC/10518/0059

Wendover Dean Viaduct, Wendover Dean

Key design considerations:

- Screening and integration of proposed Wendover Dean viaduct;
- Further integration of balancing ponds;
- Earthworks screen and integrate scheme but also retain where possible existing field patterns;
- Improved connectivity of existing woodland;
- Using existing woodland belts and proposed planting higher up the valley slopes to screen and filter views of the viaduct; and
- Design of viaduct.

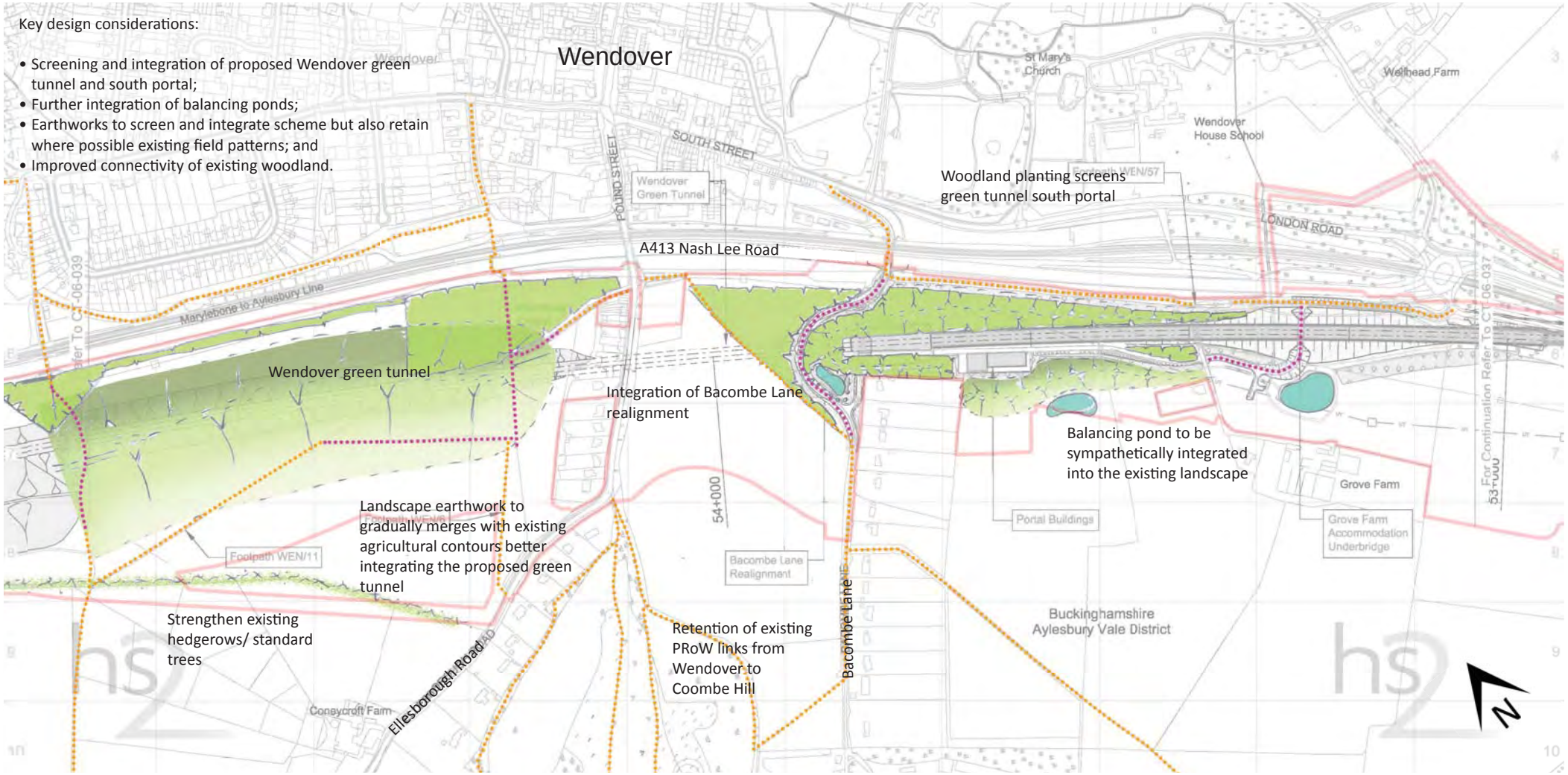


Small Dean viaduct

P7565 (34)

HOC/10518/0061

Wendover green tunnel



Wendover green tunnel north portal

Key design considerations:

- Screening and integration of proposed Wendover green tunnel and north portal;
- Improved integration of balancing ponds;
- Earthworks to screen and integrate scheme but also retain where possible existing field patterns; and
- Improved connectivity of existing woodland.

P7565 (36)

HOC/10518/0063

View from the edge of Mantle's Wood

10 - **PerspectiveViews of Key Locations of HS2 within the Chilterns AONB (for illustrative and discussion purposes)**

Chilterns tunnel north portal at Mantle's Wood

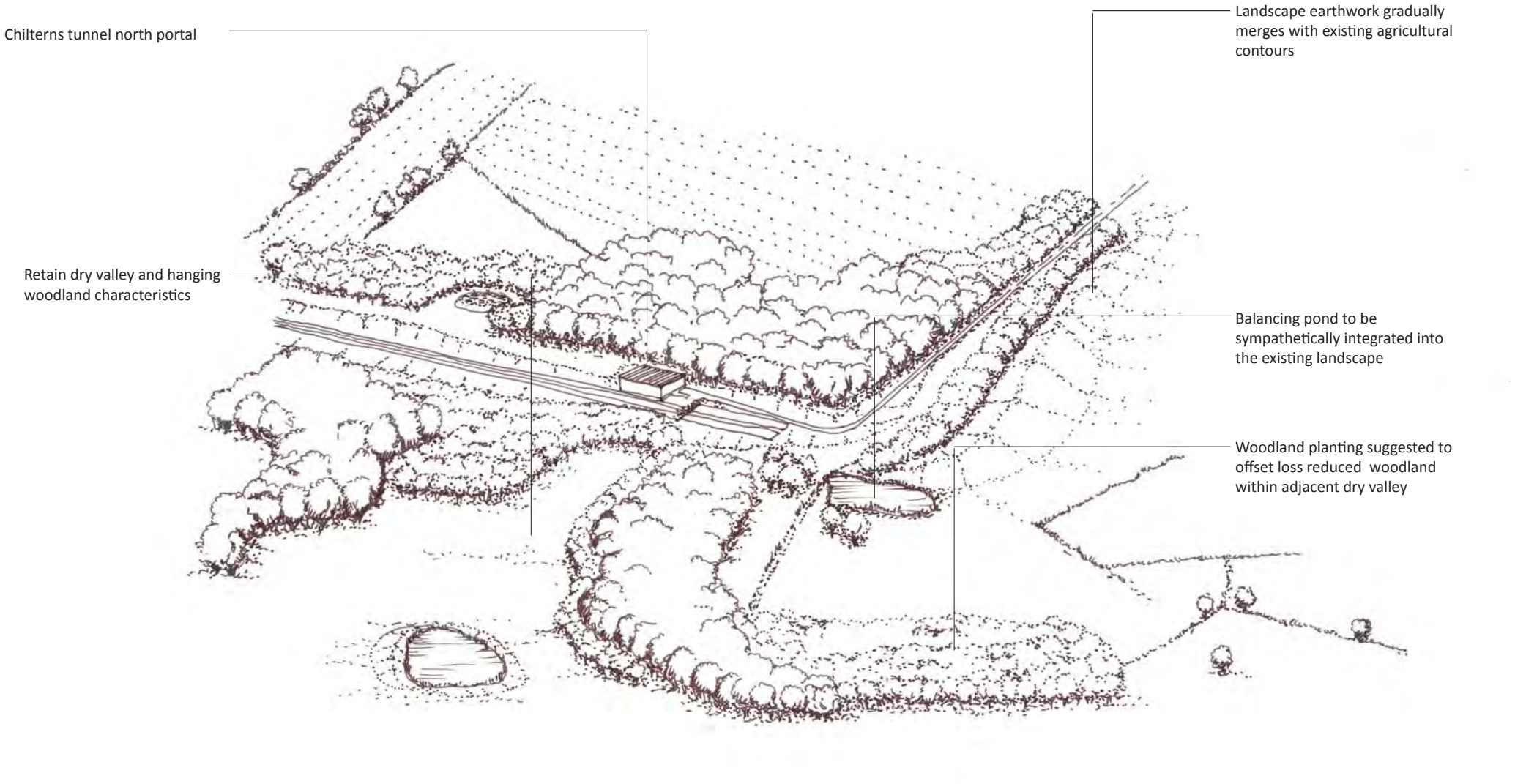


Illustration : ETM

South Heath green tunnel

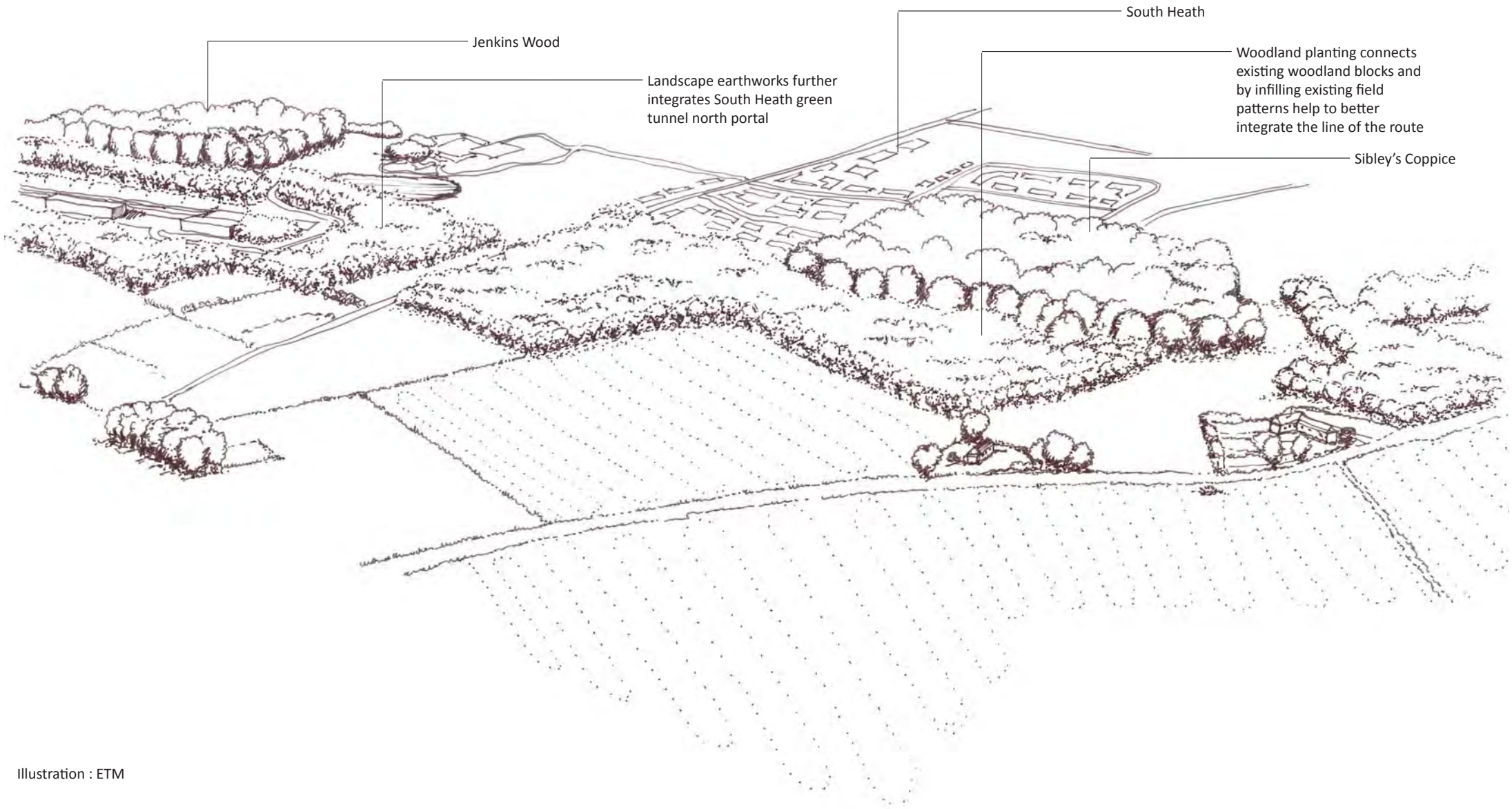


Illustration : ETM

Wendover Dean viaduct

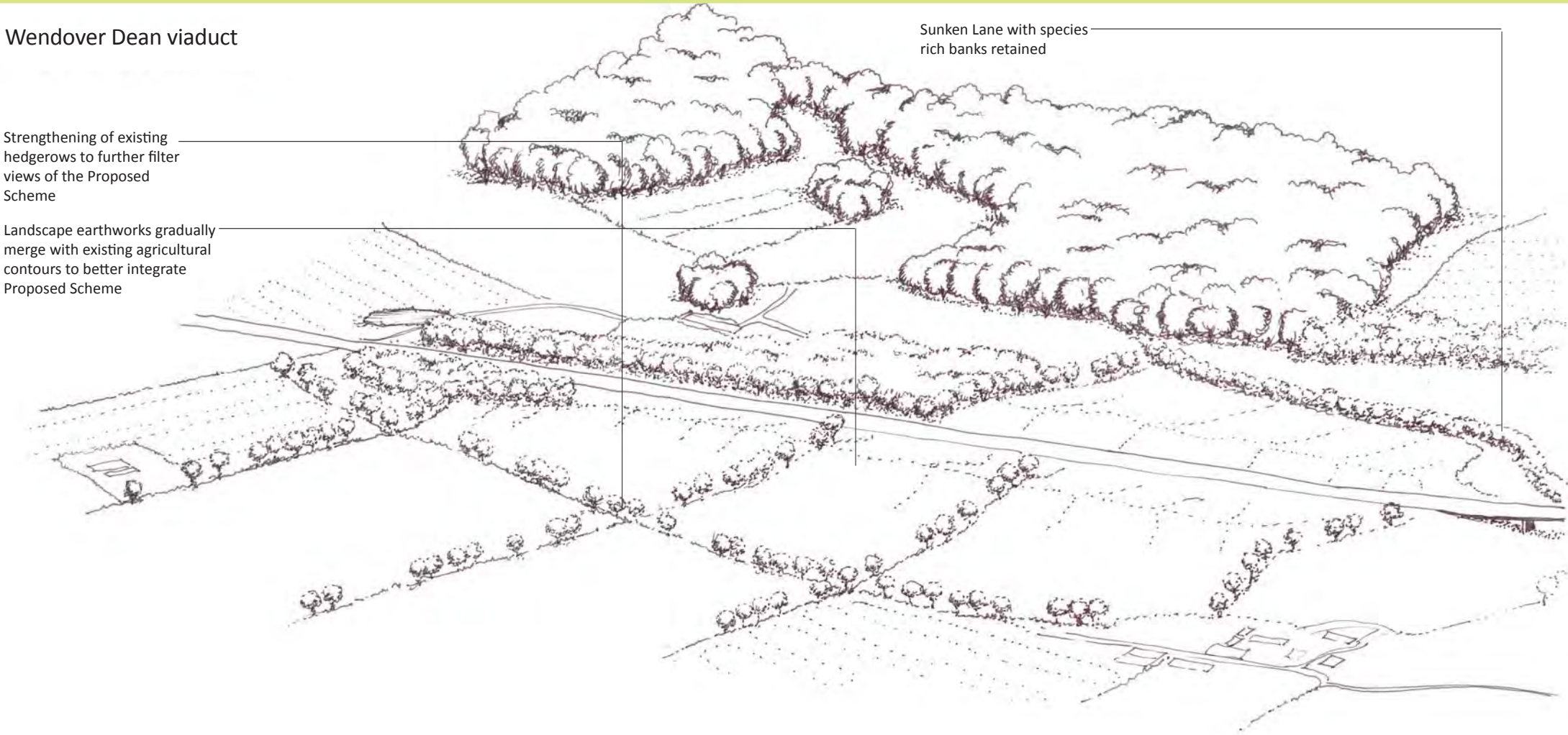


Illustration : ETM

Wendover Dean viaduct

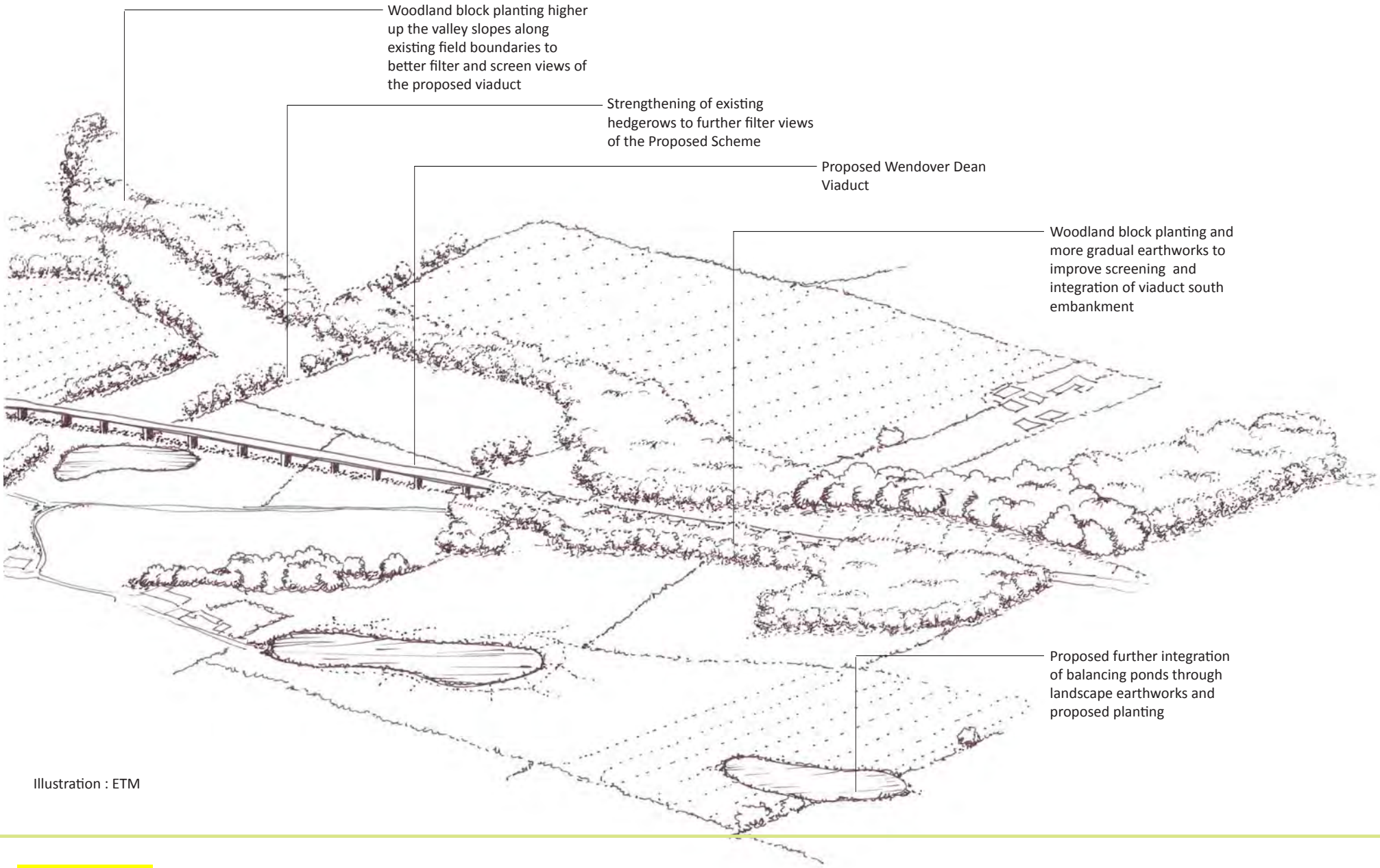


Illustration : ETM

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Small Dean viaduct

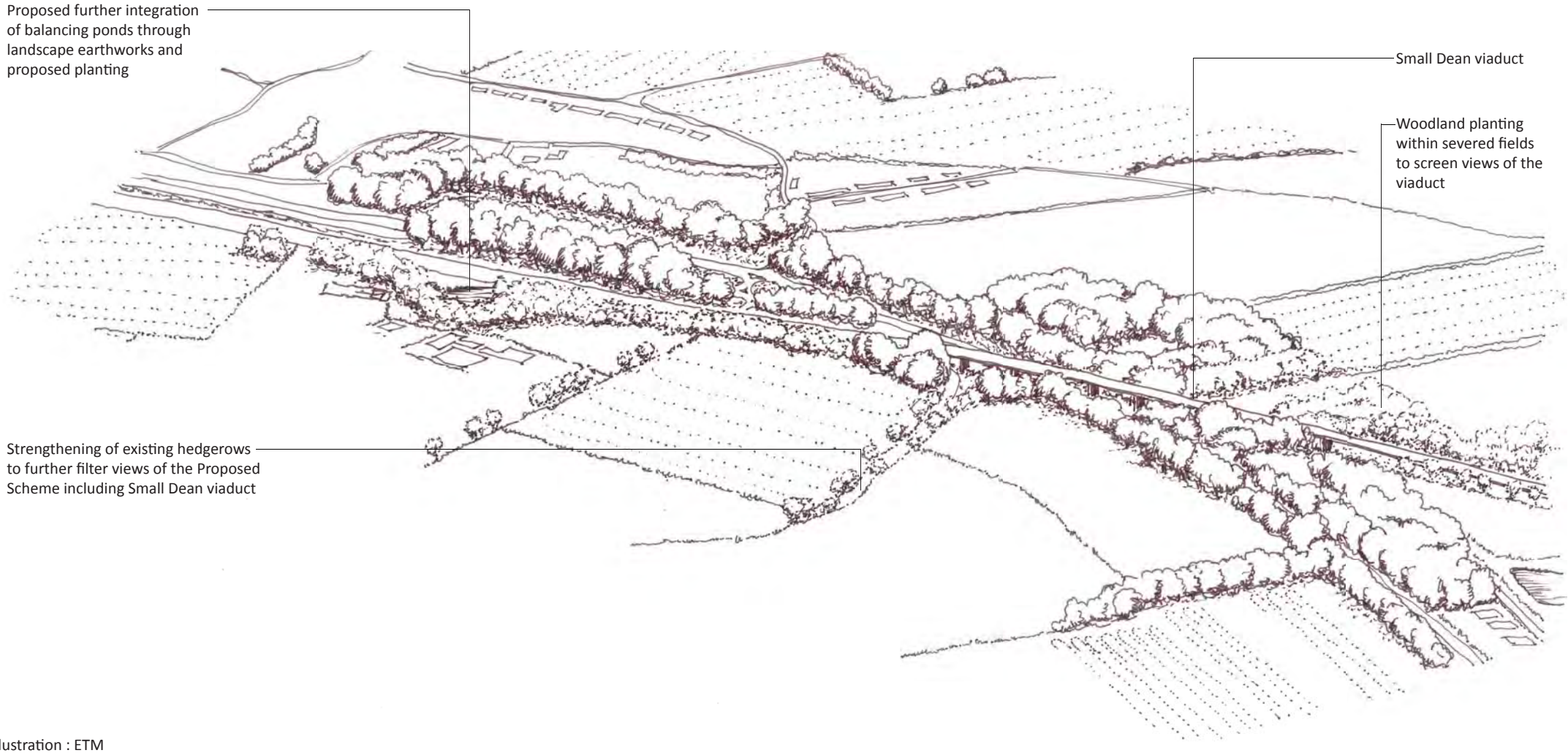

Illustration : ETM

11 - **Local Action beyond HS2**

During the progress of HS1 through Parliament the Rail Link Countryside Initiative (RLCI) was agreed. Its purpose was to promote, support, co-ordinate and encourage projects that enhance and where appropriate improve access to, the landscape, ecology and heritage of the area affected by the development or operation of HS1. It was a £2 million legacy fund for projects within the wider rail link corridor – some 2km wide. It was in addition to mitigation works required for the scheme and was a form of local 'compensation' for hosting the railway. It was available to groups or individuals and could complement existing funding streams. For example : a project the Cobham Ashenbank Management Scheme was funded to provided compensatory measures for the effects of HS1 on the historic Cobham Park through the part funding of the Woodland Trust to manage the ancient woodland situated in the Kent Downs AONB.

HS2 have set up The Community and Environment Fund (CEF) and the Business and Local Economy Fund (BLEF) which is similar to the HS1 RLCI . It will make up to £30 million available for residents and local communities between London and Birmingham to invest in public projects such as the refurbishment of local community centres, nature conservation and measures to support local economies and employment. There is the oppurtunity for local groups and businesses to bring forward proposals for the Chilterns AONB which compliment and enhance the mitigation proposals being brought forward as part of the HS2 Scheme.

12 - **Summary**

The route of the Proposed Scheme crosses the Chilterns AONB between Chalfont St Giles and Wendover. It is in tunnel and deep cutting for much of the route, but is above ground on the Wendover Dean and Small Dean viaducts. The environmental effects of the HS2 project in the Chilterns AONB were assessed in the main Environmental Statement (ES) in 2013. This reported the significant effects on the Chilterns AONB which will remain, after all mitigation is applied, on landscape character and visual receptors arising from the operation of the railway line and the presence of tunnel vent shafts, tunnel portals, substations, changes to the ground form and loss of woodland, much of it classified as ancient or ancient replanted woodland.

This report puts forward additional mitigation or improvements to the mitigation already described in the main ES, focusing on the reduction of the permanent effects of the scheme in operation. The mitigation aims to improve the integration of the HS2 route into the landscape and to restore and strengthen the existing landscape character of the Chilterns AONB. The Chilterns AONB Management Plan 2014 – 2019, the LUC report A landscape-led approach in Buckinghamshire and the Colne Valley to HS2 and relevant county and district landscape character assessments guided the development of the mitigation.

This document highlights how the mitigation necessary to reduce the effects of HS2 could be brought forward in a way which integrates with the special landscape of the Chilterns AONB. The options discussed in this document principally fall on land which has been identified in the HS2 Bill specifically for this purpose. It is however recognised that in time opportunities may present themselves to bring forward alternative proposals for mitigation on land that falls outside of the limits of the HS2 Bill. HS2 Ltd will be open to discuss these proposals with landowners and will consider whether such proposals are appropriate and can be brought forward in a way which would not give rise to delays to the programme or significant cost.

The additional mitigation includes: changes to construction boundaries to preserve landscape features, additional planting and alterations to proposed earthworks and land contouring. New woodland blocks could link existing woodlands fragmented through agricultural improvements and make better use of severed land parcels. Existing hedgerows could be strengthened and new hedgerows planted to restore historic field patterns. Engineered landforms would be softened to integrate them more naturally into the existing topography of the landscape. Through these measures, the scheme effects on the AONB would be further reduced.

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